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DEVELOPMENT OF AN ECONOMIC/ENVIRONMENTAL PLAN FOR DENTS RUN WATERSHED, WEST VIRGINIA

Halliburton Services

Prepared for:

Appalachian Regional Commission

March 1973

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DEVELOPMENT OF AN ECONOMIC/ENVIRONMENTAL PLAN FOR DENTS RUN WATERSHED

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16. Abstracts This study was initiated to inventory environmental detriments, other than acid mine drainage pollution, in the Dents Run watershed near Morgantown, West Virginia and to recommend a plan for the correction of these problems. Plans were prepared for these significant sources of pollution: wastewater(sewage &/or industrial), solid waste, junk cars, and burning coal refuse piles.Short and long range programs were developed and five priorities determined. The first is sewage disposal for individual rural homes, followed by banking burning coal refuse. Long range program priorities included sewage disposal for the Dents Run area, collection & disposal of solid waste, a county-wide program to remove junk cars, the establishment of a covered bridge as a tourist attraction, road repairs, and the enlargement of an existant public park.

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FOR
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Prepared for

The Appalachian Regional Commission
Washington, D.C.

by

Halliburton Services
Duncan, Oklahoma

March 1973

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I. INTRODUCTION

This contract between Halliburton Services, Duncan, Oklahoma and the Appalachian Regional Commission, Washington, D.C. was initiated to inventory environmental detriments, other than acid mine drainage pollution, in the Dents Run watershed near Morgantown, West Virginia. Also specified is to provide a plan for correction of the problems, indicating anticipated costs and the action to be taken by government agencies at each step in the plan.

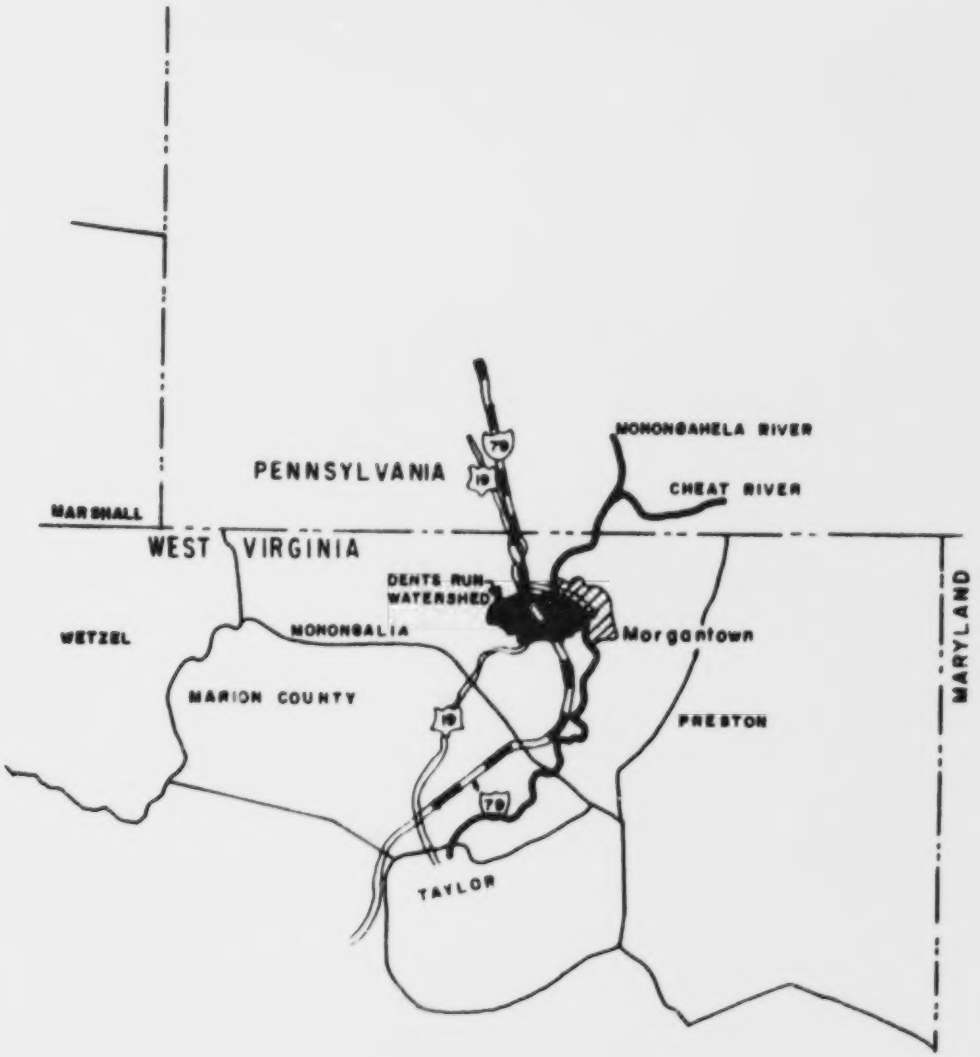
The Dents Run watershed is an area of 14.6 square miles, within Monongalia County, West Virginia, with the main axis of about 5 miles in length in a generally east-west direction. The geographic location is shown on Figure 1. This watershed is drained by Dents Run and small tributary streams, as shown on the attached map designated as Figure 2. The stream discharges into the Monongahela River in the City of Granville, West Virginia. The course of Dents Run follows U.S. Highway 19 from Laurel Point Church easterly to the Morgan Heights section of the City of Westover. Interstate Highway 79, now under construction, will cross the eastern part of the watershed from north to south.

Two cities are in the Dents Run watershed. The City of Granville has a population of about 1,050, and the City of Westover has a population of 5,089. Both of these cities have sewer collection systems, but no treatment facilities. Neither city operates any type of sanitary landfill for their solid waste disposal. Homes outside the cities use either septic tank systems, outside privies, or discharge raw sewage directly into some stream in the watershed.

Elevation of the watershed varies from a peak of approximately 1,500 feet to a valley of about 950 feet near Laurel Point, and a base of 830 feet at the mouth of Dents Run. Mountain tops are forested, but the valley sides and bottom are open grassland and farmland.

The western half of the Dents Run watershed is more of an agricultural nature, while the eastern half is mountainous and filled with mining activity.

The entire flow of Dents Run apparently consists of water flowing from mining operations or abandoned mines, except during rainy seasons. The discharge of the sewage collection systems of the City of Westover goes directly into the Monongahela River at several different points. The sewage from the City of Granville is discharged into Dents Run near its mouth, as well as into the river. Sewage is probably the greatest source of pollution in Dents Run, other than the acid mine water. Also located in the Dents Run watershed is a large operation of the Christopher Coal Company. As a part of this operation, a mine dump and a large slurry pond are operated. The coal company also pumps a considerable amount of water from the mines, and this water is discharged into Dents Run, forming a high percentage of the flow in the stream.



GEOGRAPHIC LOCATION
DENTS RUN WATERSHED
MONONGALIA COUNTY, WEST VIRGINIA

FIGURE 1

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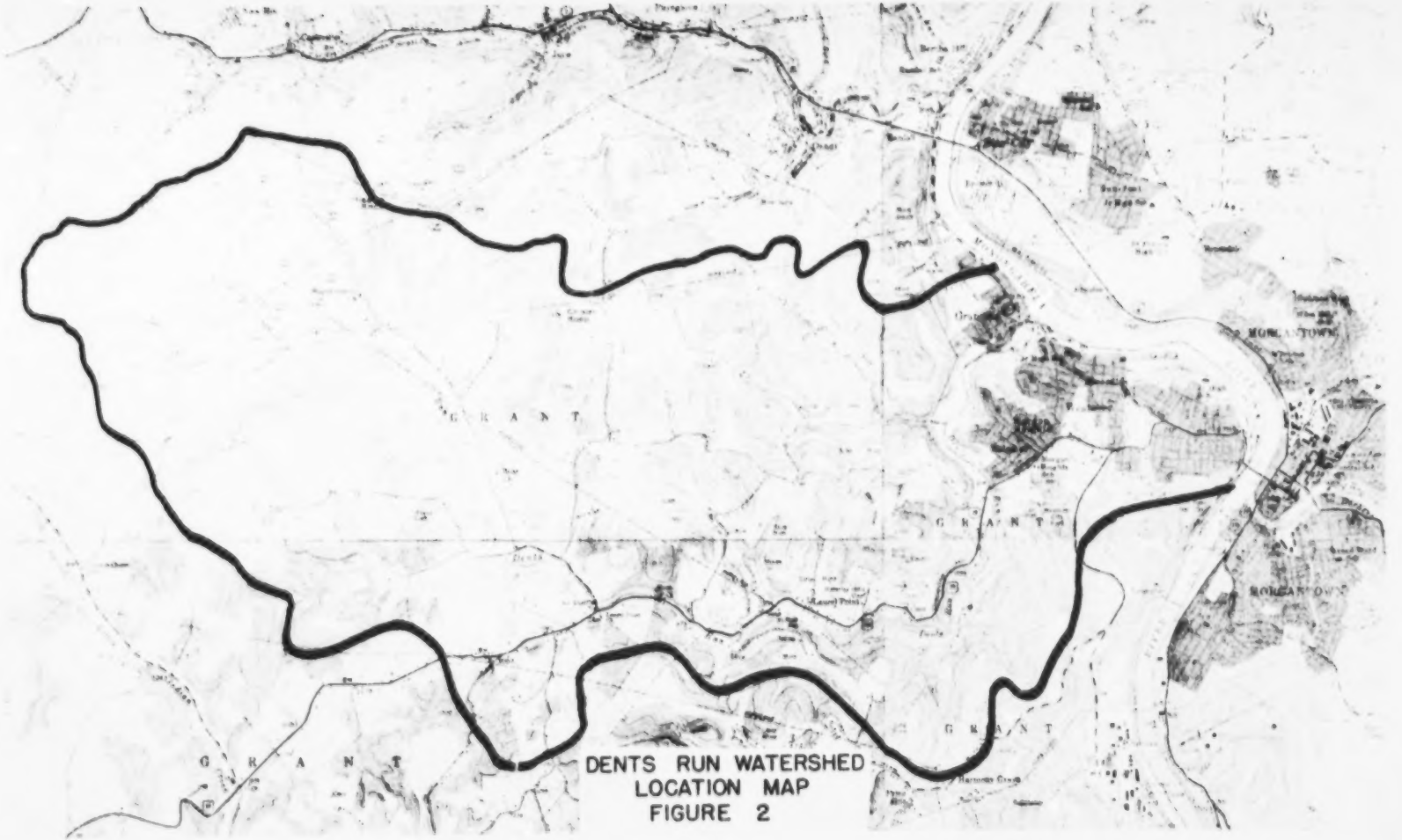

DENTS RUN WATERSHED
LOCATION MAP
FIGURE 2

II. TASKS PERFORMED

The first phase of the work which was undertaken was the review and analysis of existing data that was available on Dents Run watershed. Much of this information is included in a prefeasibility study conducted by Cyrus Wm. Rice Division of N.U.S. Corporation for Consolidation Coal Company, which is the parent company of the Christopher Coal Company that operates in the Dents Run watershed.

A. Analysis of Prefeasibility Study

Monongalia County lies on the eastern slope of the Appalachian Trough, with the axis of the major structural feature (Chestnut Ridge Anticline) passing through in a northeast-southwest direction. The system of the sedimentary rock, of which the Chestnut Ridge Anticline is the most pronounced force, forms the geology of the upper crust of the earth. The arrangement of the earth's strata is composed of systems and series. The Monongahela series runs across the county from north to south just west of the Monongahela River. Most of the Dents Run watershed is covered by this series. Figure 3 shows a geologic section for the Monongahela Series.

The study points out that the valley of the Dents Run watershed is underlain with four coal seams that outcrop along the valley sides beginning at the mouth near Granville. The lowest of these is the Pittsburgh seam. Approximately 30 feet above the Pittsburgh seam is the Redstone; approximately 90 feet above the Pittsburgh seam is the Sewickley; and approximately 375 feet above the Pittsburgh is the Waynesburg. All of the seams dip to the west. The elevation of the Pittsburgh seam is approximately 1,000 feet at Granville and about 750 feet midway west in the watershed near Sugar Grove. The valley floor elevation at Sugar Grove is approximately 1,100 feet, so the Pittsburgh seam is 350 feet below the valley floor at this point. Surface mining of the Pittsburgh-Redstone-Sewickley seams is thus confined largely to the eastern end of Dents Run watershed with surface mining of the Waynesburg outcrop occurring near the hilltops in the central part of the watershed. The only deep mining noted in the Waynesburg seam is a few house coal entries. The Pittsburg seam and the Sewickley seam have been deep mined extensively many years in the past in the eastern end of the watershed. Surface mining of these outcrops plus that of the Redstone was also largely completed prior to 1952 in the eastern end of the watershed. Some additional activity on surface mining of these seams has taken place between 1960 and 1966. Since 1966, the additional surface mining has been in the Waynesburg seam, particularly in the area around Chisler Knob.

The water flowing in Dents Run is seriously contaminated by mine drainage. There is an average discharge from the Christopher Coal Company

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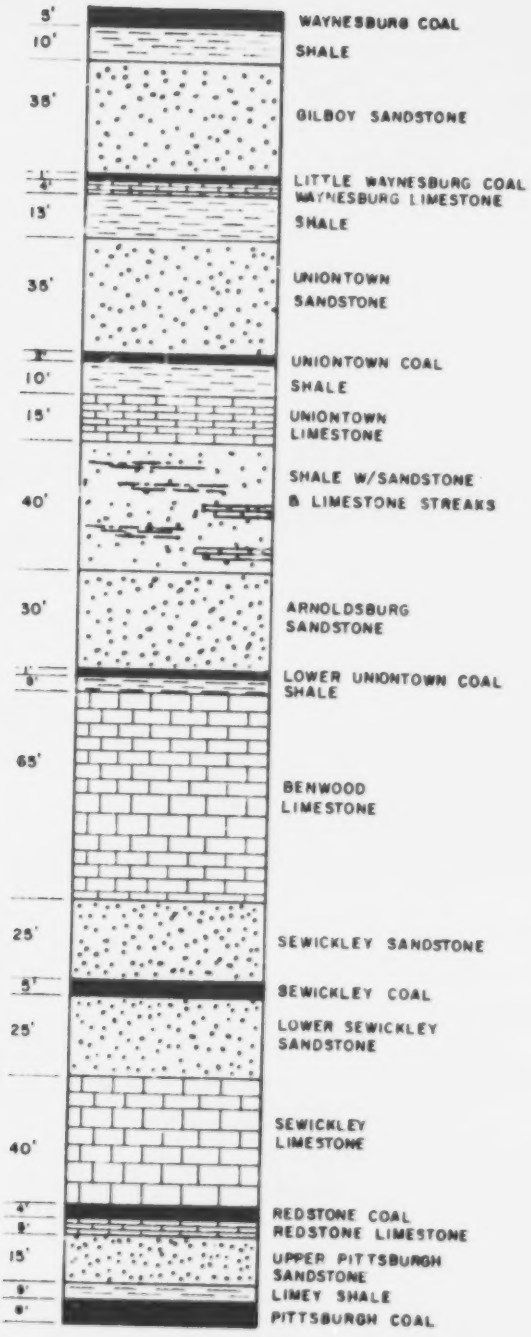


GENERAL GEOLOGIC SECTION
MONONGAHELA SERIES
DENTS RUN WATERSHED
MONONGALIA COUNTY, WEST VIRGINIA

FIGURE 3

boreholes of 48 tons per day of sulfate (expressed as sulfuric acid). An estimate of 14.75 million gallons per day is said to be discharged from Dents Run. This figure seems to be excessively high, considering the flow data that is available for the boreholes and the flow from the mines. The study states that boreholes are flowing an average of about three million gallons per day. The mines are discharging less than 200,000 gallons per day. So, these two sources are discharging only 3.2 million gallons per day. Since these apparently provide the bulk of the flow in Dents Run, it does not seem logical that the flow could be anywhere near 14.75 million gallons per day. Of course, the flow would increase proportionally during the rainy season when there would be a lot of runoff. There are some springs in the area which are flowing, but the quantity is small in the overall flow pattern.

The study reports that there is a very small amount of water impounded in the surface mined areas and only isolated cases of drainage from the surface mines. This information appears to be correct. Most of the surface mines have intercepted deep mine entries and many of these entries are still open, providing a place for drainage from the stripped areas to flow back into the deep mines. It is pointed out in the study that approximately 670,000 gallons per day of surface water is being diverted into the underground mined out areas and subsequently pumped from the deep mines from the Christopher Coal Company boreholes.

Since the coal seams dip to the west, water that enters on the eastern end of the watershed (where most of the surface disturbance is encountered) drains to the deep mines and to the boreholes where the water is pumped to the surface into Dents Run. Five of the boreholes discharge water from the Pittsburgh coal seam. The Snider borehole is discharging from the Sewickley seam. This is much less acidic than the water coming from the Pittsburgh seam. Apparently there is one abandoned mine which sometimes feeds water to the Snider borehole. At that time it does produce water that is somewhat acidic, but when the information was taken for the prefeasibility study, the acidity showed to be a minus figure and the pH was 6.1. The amount of sulfate contained was also considerably less than that in water from the other discharge points.

It was learned during our field survey that Christopher Coal Company is now completing a new borehole (Sears) to handle the water now coming from the Snider borehole. This will be southwest of the Dents Run area. The water will be treated and discharged into Little Indian Creek. Hopefully the water from the Six Right, Hess and Valotto boreholes will be diverted underground to the new Sears borehole for discharge. This would leave only the Loar borehole discharging into Dents Run. A treatment plant is under construction to treat the water prior to discharge into Dents Run.

B. Analysis of EPA Mine Inventory

The only mine inventory available for analysis is that shown in Table I of the prefeasibility study. The mines that are located in Dents Run watershed are included in Table I of the study. An attempt was made to correlate the mine numbers shown in the table with those marked on a quadrangle map with EPA mine numbers. It was very difficult to correlate the mines, for many of them were not shown on the EPA map which was available to us. It is not possible to correlate the EPA numbers with numbers designated by Cyrus Wm. Rice on the map in their study, since a different system was followed. It was determined that Mine

No. 44-041 shown in three listings on Table I was listed also in five places on the EPA map. One EPA listing corresponds to the Laurel Point borehole and one to the Loar borehole. The other three listings on the EPA map are on Little Indian Creek which is not in the Dents Run watershed.

Mine No. 44-051 is listed three times on the table from the study and on the EPA map it is designated as the Six Right borehole. Mine No. 44-064 is listed once in the table and designated on the EPA map to be the Snider borehole.

In determining the flow coming from the mines listed in the table, the flows listed for 44-041, 44-051 and 44-054 were omitted, assuming that these flows were coming from the boreholes. By omitting these values, the balance of the mines show a flow of 137,000 gallons per day. In Table II of the study the discharges are shown from the Christopher Coal Company boreholes. The flow from the boreholes is shown as an average of 2,995,000 gallons per day. The load of acid produced by the flow from the mines, assuming that the values shown in Table I under "Acidity" are actually shown in milligrams per liter, is 4,627 pounds per day. The acid added by the flow from the boreholes is an additional load of 10,799 pounds per day, giving a total acid load of 15,426 pounds per day. From these figures, it is apparent that Dents Run does contribute a high acid load to the Monongahela River.

C. Field Survey of Dents Run Watershed

During the field survey, two teams operated through the whole area and traveled every road in the watershed, using a 4-wheel drive vehicle. In addition, the areas between the roads, strip mines which had been abandoned and other areas of interest were surveyed on foot. During this survey, which also included a number of interviews with key people from city, county and state departments, a number of environmental detriments were discovered and some idea of the significant problems was obtained.

One of the primary things that was observed during the survey was the large amount of solid waste material that is being dumped indiscriminately through the watershed. Many of the coal haul roads, which had not been barricaded or closed by the mine company when the operation ceased, are being used for access to strip mine locations where garbage and refuse are dumped.

In addition to the garbage and refuse, many junk car bodies were scattered throughout the area, accumulating in larger numbers on some of the strips. These bodies were only the remains of the car, with the motor, wheels and drive systems removed. This shell has no monetary value, or at least it is very minimal. There were also three accumulations of abandoned construction equipment. Information was obtained regarding an organization called "Mountaineers for Rural Progress". This group aims to aid in the location and identification of junk vehicles.

All trash dumps, junk car and junk equipment accumulations which were located are coded and listed in Table I. The locations of these in the watershed are shown on the map attached as Figure 4.

Another fact discovered during the survey was that many of the homes located in the rural portion of the county in the Dents Run area are discharging raw sewage directly into Dents Run, to a tributary or to a ditch in front of the house. Very few homes have septic tanks. Many have outdoor privies, which are acceptable by the Health Department.

It was discovered that there was one coal refuse pile in Section C and one coal outcrop in Section G which are burning. These are also shown and identified on the map, Figure 4.

A covered bridge, one of the 18 left in West Virginia, is built over Dents Run in the watershed area just a short distance northwest of the Laurel Point Church.

Construction work on I-79 is progressing across the area. This work is creating quite a bit of dust in the air and causing some sedimentation in Dents Run. Building of I-79 has made it necessary to rechannel Dents Run for about 0.3 mile beginning where U.S. Highway 19 passes under I-79. Also rerouted is a section of West Virginia Route 49, which parallels the rechanneled Dents Run, and a section of West Virginia Route 46 where it intersects with U.S. 19. Route 49/1 has been rerouted to the south to intersect with Route 46 instead of Route 49.

Dents Run Boulevard, which begins at Route 100 in Granville, actually becomes Route 49 as it extends 1.4 miles to intersect with U.S. 19. This road now carries all traffic from Granville to U.S. 19 due to a collapse of the bridge on Route 100 across Dents Run. When the bridge is repaired, it will be restrictive in load limit permitted, thus continuing an abnormal amount of traffic, particularly heavy trucks, on Dents Run Boulevard. The road is a gravel road. The middle portion of the road is low in grade and has flooded at times. A section of about 0.4 mile should have the grade raised and the entire road needs to be hard surfaced or improved in some manner.

The other roads throughout the area are poor. Some of the routes are only passable with a 4-wheel drive vehicle and many are essentially one-lane roads. Since West Virginia does not have a county system for repair or maintenance of roads, all roads are classified as State roads and the State Highway Department must furnish the equipment and personnel to maintain them. This means that secondary roads in rural areas, such as cover most of the Dents Run watershed, receive very little attention. It is believed that improvement work is scheduled for Dents Run Boulevard (Route 49) by the State Highway Department because of the extra traffic thrust on the road due to the bridge failure.

There seemed to be very little air pollution from the burning coal refuse piles. The worst air pollution seemed to be from the vehicles which were working on I-79 construction, and this is a temporary condition.

There has been a privately owned and operated landfill in the Dents Run area for disposing of solid waste. This landfill has been closed recently, and a new one has been opened. The new site was examined and, in the opinion of our personnel, the site was inadequate. This was later confirmed when the State Health Department refused to issue a permit for this operation and

TABLE I

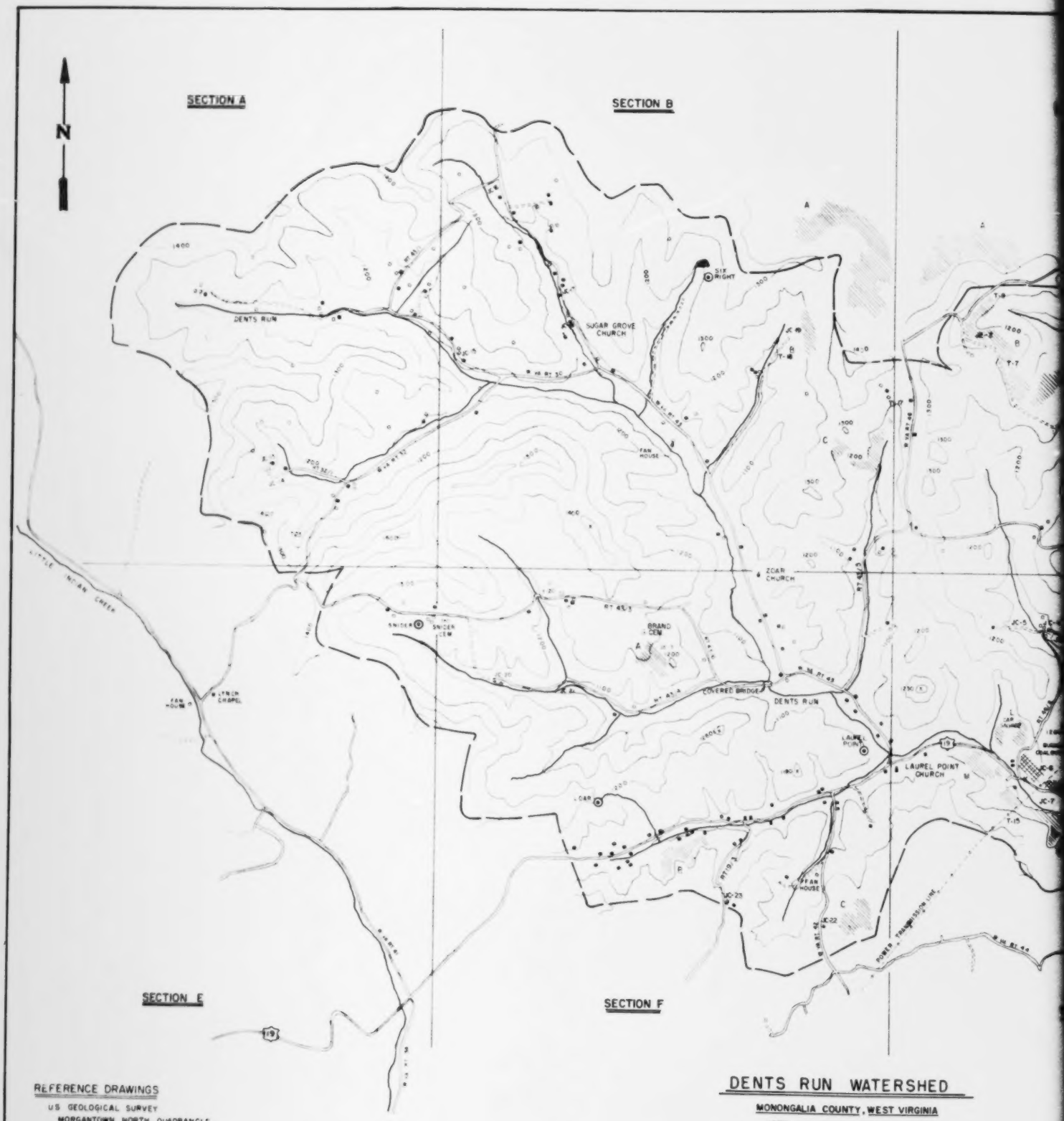
JUNK CAR ACCUMULATION LISTING
(See Figure 4)

Map Section	Map Location	Description
C	JC-1	1 junk car body
G	JC-2	Scattered car bodies - estimated at 10
G	JC-3	2 junk car bodies
G	JC-4	2 junk car bodies
G	JC-5	1 junk car body
G	JC-6	Junk car salvage lot - estimated 250 cars - privately owned
G	JC-7	Car salvage lot - privately owned - estimated 25 cars
G	JC-8	1 car body
G	JC-9	25 to 30 car bodies
G	JC-10	1 car body - 1 pickup truck body, 1 school bus body
C	JC-11	2 car bodies (in wooded area on Strip K)
G	JC-12	1 burned auto (intact).
A	JC-13	1 junk car
A	JC-14	6 junk car bodies
B	JC-15	3 junk car bodies
B	JC-16	1 junk car body
B	JC-17	10 junk car bodies
B	JC-18	1 junk car body
B	JC-19	1 junk car and several pieces discarded machinery
F	JC-20	1 junk car
F	JC-21	Rusty, discarded culvert, 2-feet in diameter, plus other junk
F	JC-22	4 junk car bodies
F	JC-23	2 junk cars
C	JC-24	3 junk cars
D	JE-1	3 1,000-gallon tanks with pumps, small van body, truck tires, antique road grader, scrap iron, 3 inoperative dump trucks, road grader, low-boy trailer, 2 small inoperative dozers
C	JE-2	Abandoned power shovel, 2 dozers and belt elevator and 1 car body
F	JE-3	2 coal shovels, 1 trailer and junk mining equipment

TABLE II

TRASH DUMP LISTING
(See Figure 4)

Map Section	Map Location	Description
C	T-1	Small garbage dump
C	T-2	Garbage, roofing and misc. large trash (appliances)
C	T-3	Large trash dump scattered down slope into stream
G	T-4	Large trash dump - fairly compact
G	T-5	Large trash dump - fairly compact
C	T-6	Trash all over strip area edges
C	T-7	Scattered trash along roadway through strip
C	T-8	Trash dump by road
C	T-9	Burned house and much trash
C	T-10	Private landfill started without permit - lots of trash, now shut down
G	T-11	Major trash dump - all kinds of trash here - scattered along strip
G	T-12	Large trash dump - all sizes trash and appliances
G	T-13	Trash dumped over side of strip
G	T-14	General trash dump
G	T-15	Trash - mostly beer cans - some garbage scattered
C	T-16	2 dump truck loads of trash - about 100 feet apart
C	T-17	Trash dump
B	T-18	Trash dump
F	T-19	Trash scattered down stream bank
F	T-20	Trash dump
G	T-21	Junk accumulated along lower edge of strip
G	T-22	Burned house - roofing dumped
A	T-23	Trash dump



REFERENCE DRAWINGS

U.S. GEOLOGICAL SURVEY

MORGANTOWN NORTH QUADRANGLE
MORGANTOWN SOUTH QUADRANGLE
RIVESVILLE QUADRANGLE
OSAGE QUADRANGLE

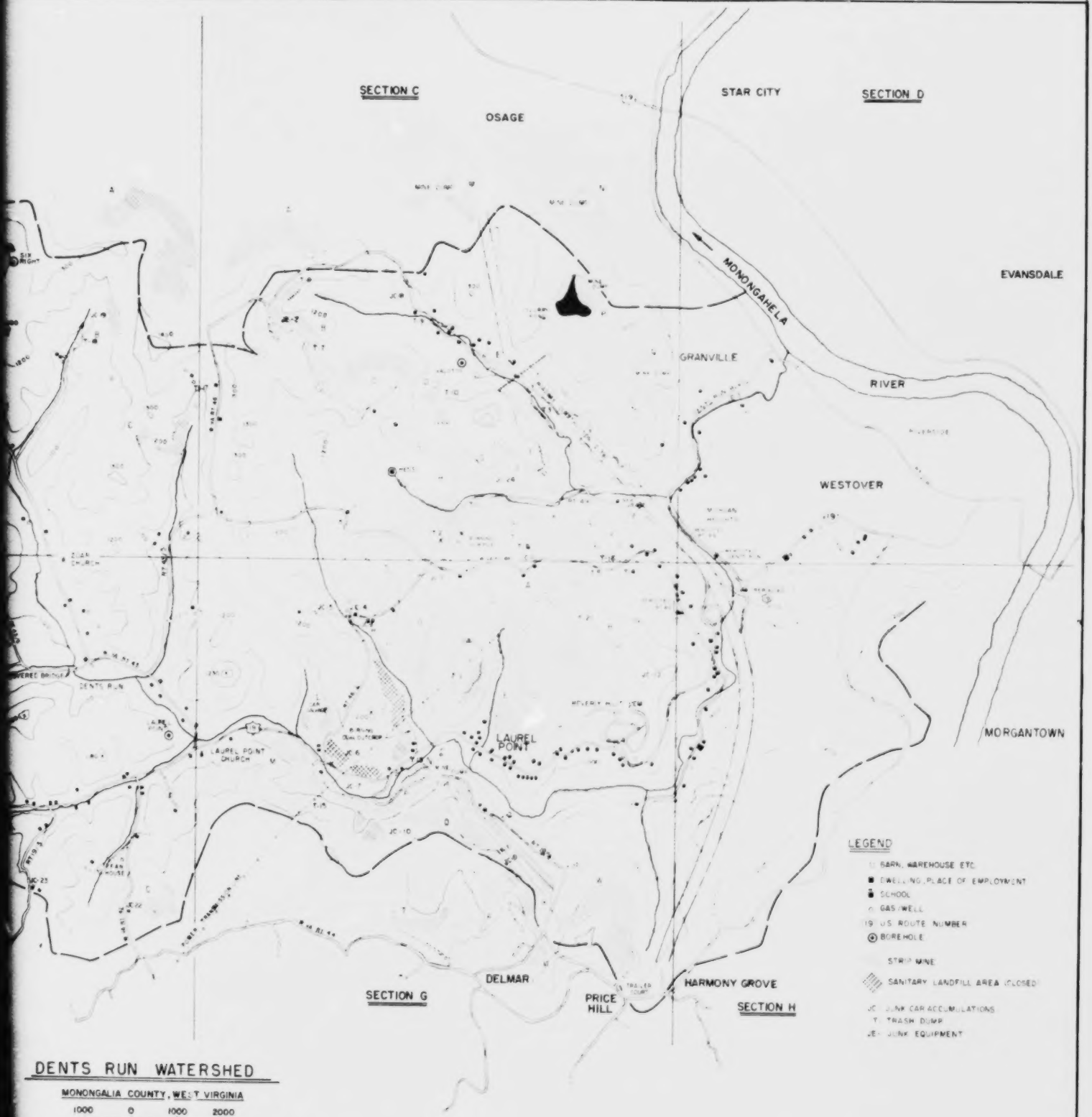
DENTS RUN WATERSHED

MONONGALIA COUNTY, WEST VIRGINIA

1000 0 1000 2000

SCALE 1" = 1000 FT

FIGURE 4



DENTS RUN WATERSHED

MONONGALIA COUNTY, WEST VIRGINIA

1000 0 1000 2000

SCALE 1" = 1000 FT

FIGURE 4

closed the landfill. The cities of Westover and Granville are now taking their solid waste to the Morgantown sanitary landfill, which is the only one in operation in the entire Monongalia County.

There are two trailer courts in the southernmost area of the watershed at Harmony Grove. One, with space for 26 or 28 mobile homes, has a packaged sewage treatment plant for the village, with effluent eventually entering Dents Run. The other trailer court has space for 15 homes. It also uses a package plant treatment system, with the treated effluent going into a tile drainage field.

A housing development, located approximately at the intersection of new Route 49/1 and Route 46, is planned for 60 homes. This development has an approved packaged treatment system for sewage disposal.

A large mobile home park is under construction in Granville. The site is the former Granville ball park and fairgrounds, located between Miller Street and Forest Street on Route 100. The railroad track forms the back boundary. There will be space for accommodating 122 mobile homes, but the initial construction will provide space for only 12 units. The sewage collection system for the park will tie into an existing line of the Granville system near the corner of Miller Street and Route 100.

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III. LEGAL AUTHORITY

The legal authority for pollution abatement action is based on several acts passed by the West Virginia State legislature and included in the Code of West Virginia.

The Water Pollution Control Act of the State of West Virginia is now Article 5A, Chapter 20 of the Code of West Virginia, 1969. This gives the State Director of the Department of Natural Resources the power and authority to administer and enforce the act. The Chief of the Division of Water Resources of the Department is responsible for the administration of the Act.

Under the provisions of the Water Pollution Control Act, the Department of Natural Resources has in effect administrative regulations (Series I and II) which govern the discharge or deposit of sewage, industrial wastes or other wastes into the waters of the State. Water quality criteria and uses of the Monongahela River and its tributaries (including Dents Run) is given in Section 13 of Series II of the regulations. However, the responsibility for approval of the design and construction of sewage treatment plants, sewerage systems and small sewage disposal systems is assigned to the State Board of Health under Article 1, Chapter 16 of the Code of West Virginia, 1970.

Supervision of local sanitation is a responsibility of the West Virginia State Department of Health in accordance with Article 1, Section 9, Chapter 16 of the Code. The State Board of Health accordingly published Administrative regulations 16-1, Series II, Section 6 which give requirements for disposal of solid waste. The regulations state that abandoned automobiles are considered as solid waste, but a separate law, Article 24 of Chapter 17 of the Code, establishes the procedure for disposal of junk and abandoned vehicles by any law enforcement agency of the State, counties or municipalities of the State of West Virginia.

The authority for financial assistance from the Farmers Home Administration is granted in the Consolidated Farmers Home Administration Act of 1961, as amended, or Public Law 89-240.

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IV. CLEANUP PROGRAM PLANS

A. Overall Plan for Dents Run Watershed

The overall plan for correcting the pollution in the Dents Run watershed, other than acid mine drainage, would be as follows:

a. Elimination of raw sewage discharge into the Monongahela River or Dents Run by providing adequate wastewater treatment facilities and necessary collection systems.

b. Eliminate open dumping of trash and garbage by providing rural collection and approved sanitary landfill operations.

c. Remove and dispose of junk cars, and provide collection point for future junk car collection.

d. Extinguish coal mine refuse fire and reclaim area.

In addition, the plan will specify an expansion of Westover City Park, the addition of a new park at the covered bridge over Dents Run and a rehabilitation of Dents Run Boulevard.

A plan of corrective action for pollution present in the Dents Run watershed must of necessity include a much larger area than that of the watershed alone, since all of the surrounding area has the same type of pollution problem found in the watershed. Any tangible improvement accomplished in the Dents Run watershed would be evident in the Monongahela River, near the mouth of Dents Run. However, if significant improvement is to be made in the overall quality of the water in the Monongahela River, tributaries along the river must also be cleaned up.

It is realized that much of the pollution in the streams of this area of West Virginia is due to acid mine water drainage. But pollution is also caused by people, and in this contract we will focus on that area of pollution.

The primary economic benefits to be realized by a cleaner water system in the watershed, and in the county in general, would be in the realm of recreational activities and industrial expansion. Recreation would bring money into the area through tourist business, as well as provide better areas for living for the residents. The influx of small or medium-size manufacturing concerns would provide additional employment opportunities, which in turn would require new housing or residential development for families attracted to the industry. It would also lower the cost of water treatment for cities downstream who use the river as a source of water.

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The primary factor causing polluted water, other than acid mine drainage, is the discharge of raw sewage into the streams. This type of pollution will be corrected by necessary treatment plants and an enlarged network of wastewater collection systems to cover the portion of the watershed which can be included in the sewage district.

The creation of a sanitary or public service district will be proposed to construct and operate the necessary wastewater treatment plants for the Dents Run area and any additional area which might be included in the district. Most of the areas in Dents Run which would be adaptable to sewer service have already been supplied with water from small, numerous public service districts already in existence. If a large district is established for sewage disposal, it would be economically advantageous for this district to also take over the water distribution from the numerous small public service districts now in operation over the county. This would permit one organization to coordinate water distribution and sewage (and even solid waste) disposal and afford the opportunity to collect for all of these services. This would be the most stable financial base for the operation of the larger district.

In order to reclaim the land now being used as recipient of open dumping of solid waste and abandoned vehicles, it may be proposed that the sanitary or public service district established for the operation of wastewater collection and treatment also manage and operate one or more sanitary landfills in the district. A system of collection for both urban and rural areas would also be recommended, as well as a means of collecting and disposing of junk vehicles.

Air pollution is minimal in the watershed, but that which is produced by two burning coal refuse piles will be eliminated by extinguishing the fires and reclaiming the area of the present burning coal refuse piles. One of these is on the site recommended for a sanitary landfill. The expansion of Westover Park into a larger regional-type recreational area and the establishment of a historical park area at the site of the covered bridge over Dents Run will be recommended. These would be of value in attracting tourists to the area.

Industrialization could best be provided for in the area created between Interstate 79 and the river south of Westover Park expansion. The need for additional housing could be provided by expansion of the housing areas along U.S. 19 west of I-79.

B. Specific Plans for Pollution Correction

The specific plans for correction of pollution within the Dents Run watershed have been classified into environmental detriments which exist in the area and aesthetic detriments which could contribute economic benefits to the area as corrective action is taken.

Plans are classified as short-range programs when action can begin within six months and be accomplished by informative and educational promotion, and which can be performed under existing laws without necessitating new laws or additional appropriations. Long-range program plans would be those which require longer time for initiation, new laws or additional funding.

Governmental responsibility for each program was determined according to legal authority. Cost estimates are given for each plan presented. A combination of solutions is presented in some cases, with the most economical plan recommended.

1. Environmental Detriments

Plans were prepared for the following significant sources of pollution:

a. Wastewater (sewage and/or industrial)
b. Solid Waste
c. Junk Cars
d. Burning Coal Refuse Piles

Sedimentation does not appear to be a major problem or one which would warrant expenditure of funds, so no corrective action is recommended. Air pollution does not exist in significant quantity to cause alarm. That which is noticeable can be traced to the burning coal refuse and engine exhausts. Plans are presented for eliminating the burning coal refuse pollution. The exhaust emissions are being corrected on a national scale, so no plans are presented for prevention of air pollution. During the next 10 to 25 years, as industry comes into the area, compliance with existing state laws would prevent occurrence of air pollution from the plants.

1.1 Wastewater Collection, Treatment and Disposal

Perhaps the biggest single problem in the Dents Run area, other than acid mine drainage, is the detrimental effect that the discharge of raw sewage has on the quality of the water in Dents Run and the Monongahela River. The cities of Granville and Westover both have sewage collection systems, but discharge their waste without treatment into Dents Run or directly into the Monongahela River. Many rural homes discharge their sewage directly into some stream. Enactment of the Water Pollution Control Act by the Congress of the United States gives a mandate to the cities in regard to discharging raw sewage into the navigable streams and tributaries of the nation. The cities that have no treatment facilities, and therefore discharge their raw sewage directly into a stream, are under ultimatum from the Federal Government to cease this practice.

It is proposed that the problem of untreated sewage in the Dents Run watershed be solved by providing proper collection systems and treatment for the sewage effluent in both urban and rural areas before it is discharged into the area streams.

The benefits to be derived from collecting and treating the sewage, rather than discharging it at random untreated into the streams, cannot be given an economic value. However, it can certainly be shown to have a value to the people of the area through increased quality of the water that is available and the improvement of services to people by such systems.

As mentioned in a previous discussion, the clean water that would be available would be an inducement for increased recreational activities and tourist attractions, and in this manner, bring additional money into circulation in the county, resulting from the influx of sportsmen and tourists.

The sewage problem can actually be divided into two separate phases. One phase would be concerned with rural homes where individual systems must be installed to handle the sewage properly.

The other phase would be concerned with the cities and nearby suburban areas where sewage collection systems exist or could be installed.

Four different plans will be considered for the collection, treatment and disposal of sewage wastewater which would affect the Dents Run area. These four are enumerated below:

A. The city of Westover would construct a sewage treatment plant somewhere in the Westover area. This plant would handle the sewage treatment for Westover, Osage and Granville plus the houses along U.S. 19 for about 9,000 feet southwest of Laurel Point Church.

B. The towns of Westover, Granville and Osage, plus the residents along U.S. 19 would have their sewage collected and sent to a common interceptor pipe, over or under the river to the Morgantown sewage plant, which would be expanded in capacity and enlarged to include secondary treatment.

C. A public service district would be formed for that part of Monongalia County west of the Monongahela River. Sewage would be collected, treated in one or more plants, and discharged after secondary treatment.

D. A county-wide public service district would be formed for Monongalia County to collect, treat and dispose of the treated effluent for all the sewage in the towns and communities of Monongalia County.

Each of the plans will be discussed in detail on the following pages. One of the plans will be recommended as the specific plan to be implemented as a result of the proposal.

1.11 Sewage Disposal for Individual Rural Homes

This phase would include homes with inside toilet facilities that do not have an approved disposal system for their sewage or homes with outdoor privies. Homes which must have septic tank systems are shown on the map of Dents Run, Figure 5. This would include all homes in Sections A, B and C and homes in Section F which are not near enough to U.S. 19 to connect to the sewers.

Recommended Program - Short-Range

Step 1 - Inform and educate the citizens living in the rural area of Dents Run watershed regarding the necessity of proper sewage disposal for good health care by means of newspaper, radio or visits by Health Department personnel.

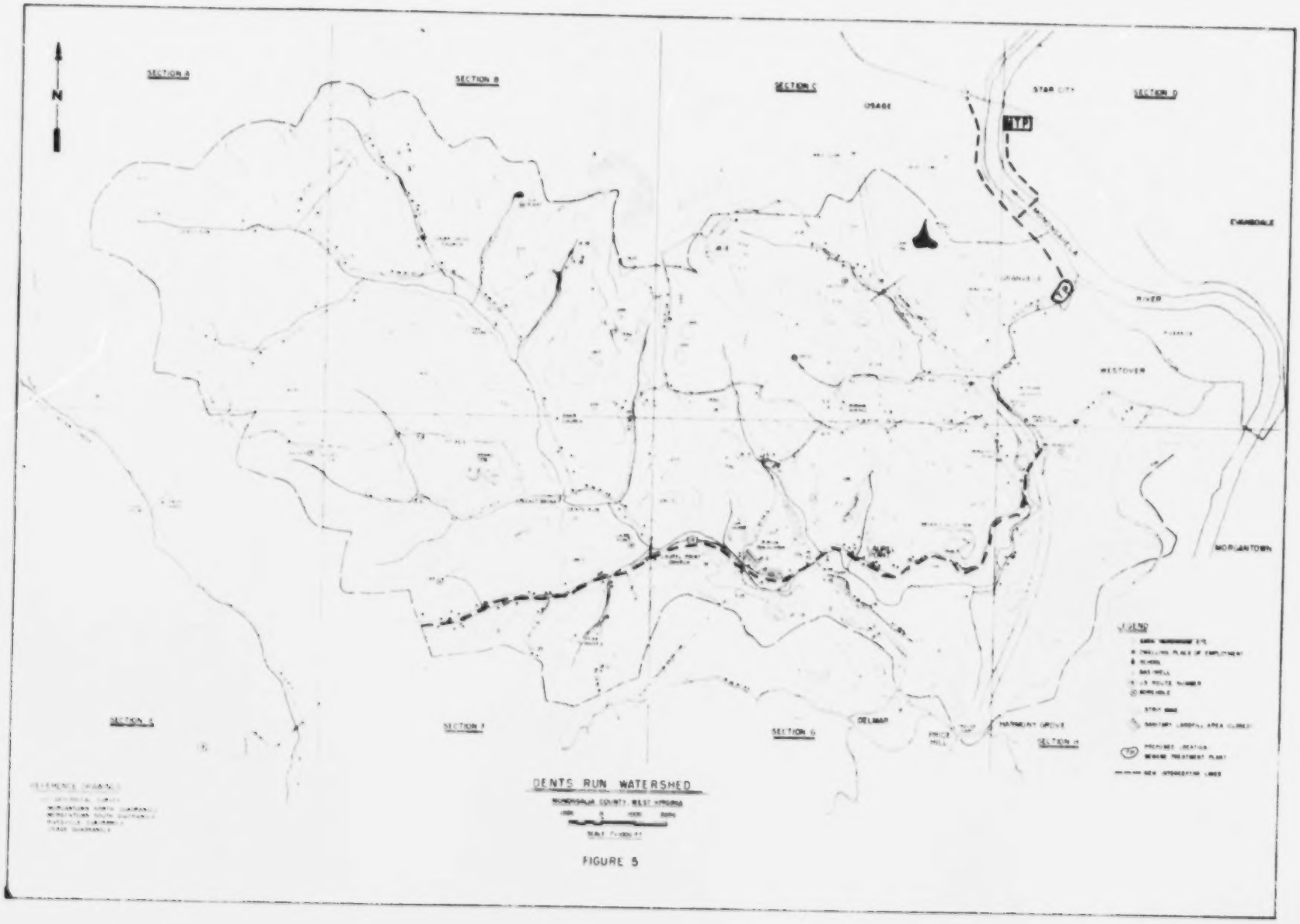

N
SECTION A
SECTION B
SECTION C
SECTION D
SECTION E
SECTION F
SECTION G
SECTION H
WESTOVER
MORGANTOWN
DELMAR
DENTS RUN WATERSHED

FIGURE 5

Step 2 - Provide help for residents in planning a septic tank disposal system for their home. County Health Department should furnish application forms and help run soil percolation test. Residents should be advised of financing available in the form of low interest loans from Farmers Home Administration.

Step 3 - Deadline should be established for installing septic tank system in homes discharging raw sewage into streams or tributaries.

Step 4 - Plans for septic tank system are to be approved by County Health Department when submitted from home owners.

Step 5 - Home owners construct septic tank systems.

Government Responsibility

1. County Health Department, Monongalia County, West Virginia

2. State of West Virginia Health Department

Authority: Chapter 16, Article 1, Public Health Laws, Code of West Virginia and Chapter 1, Part III, Regulations of the West Virginia Board of Health.

The State Health Laws require approved sewage disposal systems for each resident. Priority was assigned to the County Health Department since the State Department of Health has delegated to each county the responsibility of implementing their laws and regulations in their respective county. Permits and inspections are a function of the County Health Department.

Cost Estimate

The cost for installation of septic tank systems must be borne by the property owner and would not come from public funds. There are approximately 74 rural homes in the Dents Run watershed which would not be able to connect to the sewer system and would need septic tank systems. Possibly 20% of the homes do not have sufficient water to operate a septic tank system. Of the remaining 60 homes, the installation of a septic tank system would be a boost in the standard of living for the residents.

Cost for septic tank and disposal field installation would be about $500 to $750 per home.

Source of Funds - Farmers Home Administration, U.S. Department of Agriculture, Morgantown, West Virginia (Individual loans at low interest).

1.12 Sewage Collection and Treatment for Urban Areas

PLAN A - Westover Treatment Plant Which Would Also Handle Sewage for Granville, Osage and Houses Along U.S. 19 in Dents Run Area

The cities of Westover and Granville do not have wastewater treatment systems at this time. Both cities have collection systems which are assumed to be adequate for each town's need, except for the addition of interceptors when a treatment system is built. Granville has a combined system with one 10-inch line discharging into Dents Run near the mouth. It also has one 10-inch line and seven 6-inch lines discharging into the Monongahela River downstream from Westover. The Westover collection system has lines discharging raw sewage into the Monongahela River from Wilson Street, Maryland Avenue, two outlets near Center and Ferry Streets and one between Snyder and Carrison Street. A main collector discharges into the mouth of Dents Run and two others into Dents Run near West First Street.

A treatment plant for the city of Westover has been under study since 1965. A consulting firm in Charleston, West Virginia is currently working on plans for a plant with a design capacity of 750,000 gallons per day, but no firm commitments have been made by Westover officials for proceeding with financing arrangements or construction.

It is the intent of this plan that the current engineering be altered to enlarge the treatment plant to include the additional people in Granville, Osage and along U.S. 19 to a point about 8,000 feet southwest of Laurel Point Church. The current design calls for contact sludge stabilization, which will be continued in this plan. Recommended plant site and interceptor locations are shown on Figure 5.

Recommended Program - Long-Range

Step 1 - Westover city officials should obtain necessary agreements with the towns of Granville and Osage for handling their sewage effluent.

Step 2 - Request the consulting engineers to enlarge the treatment facility under consideration to a design capacity of 1.2 million gallons per day.

Step 3 - Request plans from engineers for interceptors to reach Osage and Granville, as well as extending interceptor along U.S. 19 to a point 8,000 feet southwest of Laurel Point Church.

Step 4 - Make definite requests for necessary grants and arrange for additional financing needed for both plant and collection systems.

Step 5 - Request bids on construction.

Step 6 - Construct plant and collection systems and begin operation.

Government Responsibility

Priority 1 - West Virginia State Health Department
Charleston, West Virginia

Authority: Chapter 16, Article 13, Public Health Laws,
Code of West Virginia

Priority 1 was given to West Virginia State Health Department because they are assigned primary responsibility for proper wastewater treatment in the cities of West Virginia. This department also has the laws for establishing sanitary districts and must approve all treatment facilities.

Priority 2 - Water Resources Division, West Virginia Department
of Natural Resources, Charleston, West Virginia

Authority: Article 5A, Chapter 20, West Virginia Code

Priority 2 was given to Water Resources Division, Department of Natural Resources because this group is responsible for water quality and would be involved in approval of plans for any treatment facilities.

Priority 3 - Environmental Protection Agency
U.S. Department of the Interior
Washington, D.C.

Priority 3 was given to the Environmental Protection Agency because they have authority to approve applications for grants for wastewater treatment facilities.

Priority 4 - Department of Housing and Urban Development
Washington, D.C.

Priority 4 was given to the Department of Housing and Urban Development since they have grants which can be given for collection systems.

Priority 5 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

Priority 5 was given to the Federal-State Relations Office since it is involved in any federal grants to the state.

Priority 6 - Mayor and/or City Council
Westover, West Virginia

Mayor and/or City Council
Granville, West Virginia

City Government
Osage, West Virginia

Cost Estimates:

Initial Cost (Collection & Treatment)

Treatment Plant Construction (for 12,000 people) - - - -	$ 600,000
Intercepting Sewers, Force Mains and Lift Stations (Westover Only)- -	450,000
30,000 feet of 10-inch Interceptor to Osage and Down U.S. 19 from Westover - - - - - - - - - - - - - - - -	600,000
2 Lift Stations on U.S. 19 - - - - - - - - - - - - - - - -	50,000
1 Lift Station Near Osage - - - - - - - - - - - - - - - -	25,000
Engineering, Legal & Land Costs - - - - - - - - - - - - -	340,000
Total Cost	$2,065,000

Sewage Collection & Treatment Department

Annual Operating Cost (7,000 People)

Salaries -	$ 46,400
Materials & Supplies - - - - - - - - - - - - - - - - - - -	3,000
Expense - Treatment Plant- - - - - - - - - - - - - - - - -	7,200
Utilities- -	6,500
Equipment Depreciation - - - - - - - - - - - - - - - - - -	5,000
Office & Operational Expense - - - - - - - - - - - - - - -	12,000
Total Cost	$ 80,100

Cost per Capita - - - - -$11.45

Source of Funds:

1. Environmental Protection Agency, U.S. Department of the Interior, Washington, D.C. - for 30% at the present time.

2. Department of Housing and Urban Development Washington, D.C. - for Sewer Construction grant.

3. Federal-State Relations Office, State Capitol, Charleston, West Virginia. This office would aid in the obtaining of grants for the project.

Note: If the State of West Virginia financing plan for construction of sewers and treatment plants is implemented, the municipalities will be eligible for 25% state funding and 55% U.S. Government funding (EPA, HUD and ARC). The sanitary district would have to furnish 20%, which might be done through a bond election.

PLAN B - The Cities of Westover, Granville and Osage Plus the Rural Areas Along U.S. 19 as included in Part A, Would Move Their Sewage Across the Monongahela River to the Morgantown Plant, Which Would Have to be Expanded and Have Secondary Treatment Added.

This plan would require the same collection systems as set forth for Plan A. In lieu of building a treatment plant, it would be necessary to build an interceptor across the river with pumping equipment to move the sewage. An agreement between the cities west of the river and the City of Morgantown would need to be drawn up and approved by respective city governments to establish the rates to be charged each city for treatment of their sewage.

Enlargement of the Morgantown treatment plant's present primary treatment facilities would need to be made to treat an additional 1.2 million gallons per day. Secondary treatment would need to be added to treat 7.2 million gallons per day. Westover communities would have to pay their proportionate share.

Recommended Program - Long Range

Step 1 - Westover City Officials should obtain necessary agreements with the towns of Granville and Osage for a joint system of waste collection.

Step 2 - Morgantown city officials should establish rates to charge for incoming sewage from area west of river.

Step 3 - Agreement should be made between Morgantown and Westover for charges of sewage treatment.

Step 4 - Westover should obtain plans for interceptors to cover area of Plan A as shown on Figure 5, as well as that needed to cross the river and reach the treatment plant.

Step 5 - Morgantown officials should obtain plans for expansion of primary treatment facilities from 6 million to 7.2 million gallons per day, and for addition of secondary treatment facilities to handle 7.2 million gallons per day.

Step 6 - Request bids on construction of system.

Step 7 - Proceed with construction.

Step 8 - Initiate operation on completion of construction of both plant and systems.

Government Responsibility

Priority 1 - West Virginia State Health Department
Charleston, West Virginia

Authority: Chapter 16, Article 13
Public Health Laws
Code of West Virginia

Priority 1 was given to West Virginia State Health Department because they are assigned primary responsibility for proper wastewater treatment in the cities of West Virginia. This department also has the laws for establishing sanitary districts and must approve all treatment facilities.

Priority 2 - Water Resources Division
West Virginia Department of Natural Resources
Charleston, West Virginia

Authority: Article 5A, Chapter 20,
West Virginia Code

Priority 2 was given to Water Resources Division, Department of Natural Resources because this group is responsible for water quality and would be involved in approval of plans for any treatment facilities.

Priority 3 - Environmental Protection Agency
U.S. Department of the Interior
Washington, D.C.

Priority 3 was given to the Environmental Protection Agency because they have authority to approve applications for grants for wastewater treatment facilities.

Priority 4 - Department of Housing and Urban Development
Washington, D.C.

Priority 4 was given to the Department of Housing and Urban Development since they have grants which can be given for collection systems.

Priority 5 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

Priority 5 was given to the Federal-State Relations Office since it is involved in any federal grants to the state.

Priority 6 - Mayor and/or City Council
Morgantown, West Virginia

Cost Estimates:

Initial Cost (Collection & Treatment)

Intercepting Sewers, Force Mains & Lift Stations (Westover)	$ 450,000
30,000 feet of 10-inch Interceptor to Osage & Down U.S. 19 from Westover	600,000
3 Lift Stations (U.S. 19 & Osage)	75,000
Line & Pumping Across River	250,000
Enlargement of Plant - Primary Treatment	200,000
Share of Secondary Treatment Facilities (20%)	350,000
Engineering, Legal & Land Costs	375,000
Total Cost	$2,300,000

Sewage Collection & Treatment Department

Annual Operating Cost (7,000 people)

Treatment Charges ($30.00/1000 GPD)	$ 21,000
Salaries (Collection System)	25,500
Equipment Depreciation	2,500
Materials & Supplies	3,000
Maintenance Operations	12,000
Utilities	1,800
Office & Supervisory	6,000
	$ 71,800

Cost per Capita - - - - -$10.25

Source of Funds:

1. Environmental Protection Agency, U.S. Department of the Interior, Washington, D.C. - for 30% at the present time.

2. Department of Housing and Urban Development Washington, D.C. - for Sewer Construction Grant.

3. Federal-State Relations Office, State Capitol, Charleston, West Virginia. This office would aid in the obtaining of grants for the project.

   Note: If the State of West Virginia financing plan for construction of sewers and treatment plants is implemented, the municipalities will be eligible for 25% state funding and 55% U.S. Government funding (EPA, HUD and ARC). The sanitary district would have to furnish 20%, which might be done through a bond election.

PLAN C - A Public Service District Could be Formed for Western Monongalia County for Collection and Secondary Treatment of Sewage

This plan would encompass all of Monongalia County west of the Monongahela River. This covers an area of 205 square miles and would include about 19,500 people, but the treatment would only reach about half of the people. A second treatment plant with a capacity of 400,000 gallons per day would be built in the Blacksville area.

Recommended Program - Long-Range

Step 1 - The Western Monongalia County Public Service District would be established by the County Court of Monongalia County for the purpose of providing sewage collection and disposal in the county area west of the Monongahela River.

Step 2 - The City of Westover would appoint one member of the Public Service District Board. The County Court would appoint two additional members. The board would meet to select a chairman.

Step 3 - Two sites would be selected for establishment of treatment plants. One site would be in the Westover area, as set forth in Plan A. The other site would be in the Blacksville area.

Step 4 - Plans should be prepared by a consultant firm engaged by the District for both plants and interceptors to nearby areas of population as shown on the map, Figure 6. Additional interceptors would run from Blacksville to Pentress and from Osage to Cassville.

Step 5 - Make definite requests for necessary grants and arrange for any other financing required to construct the systems.

Step 6 - Request bids on construction.

Step 7 - Construct plants and interceptors and begin operation.

Government Responsibility

Priority 1 - County Court
Monongalia County

Authority: Chapter 16, Article 13A
Public Health Laws
West Virginia Code

Priority 1 was assigned to the County Court since this group must establish the public service district.

Priority 2 - West Virginia State Health Department
Charleston, West Virginia

Authority: Chapter 16, Article 1, Section 9
Public Health Laws
West Virginia Code

Priority 2 was given to West Virginia State Health Department because they are assigned primary responsibility for proper wastewater treatment in the cities of West Virginia. This department also has the laws for establishing sanitary districts and must approve all treatment facilities.

Priority 3 - Monongalia County Health Department
Morgantown, West Virginia

Authority: Chapter 16, West Virginia Code

Priority 3 was given to the Monongalia County Health Department since this group will be primarily responsible for implementing the State regulations on the local level.

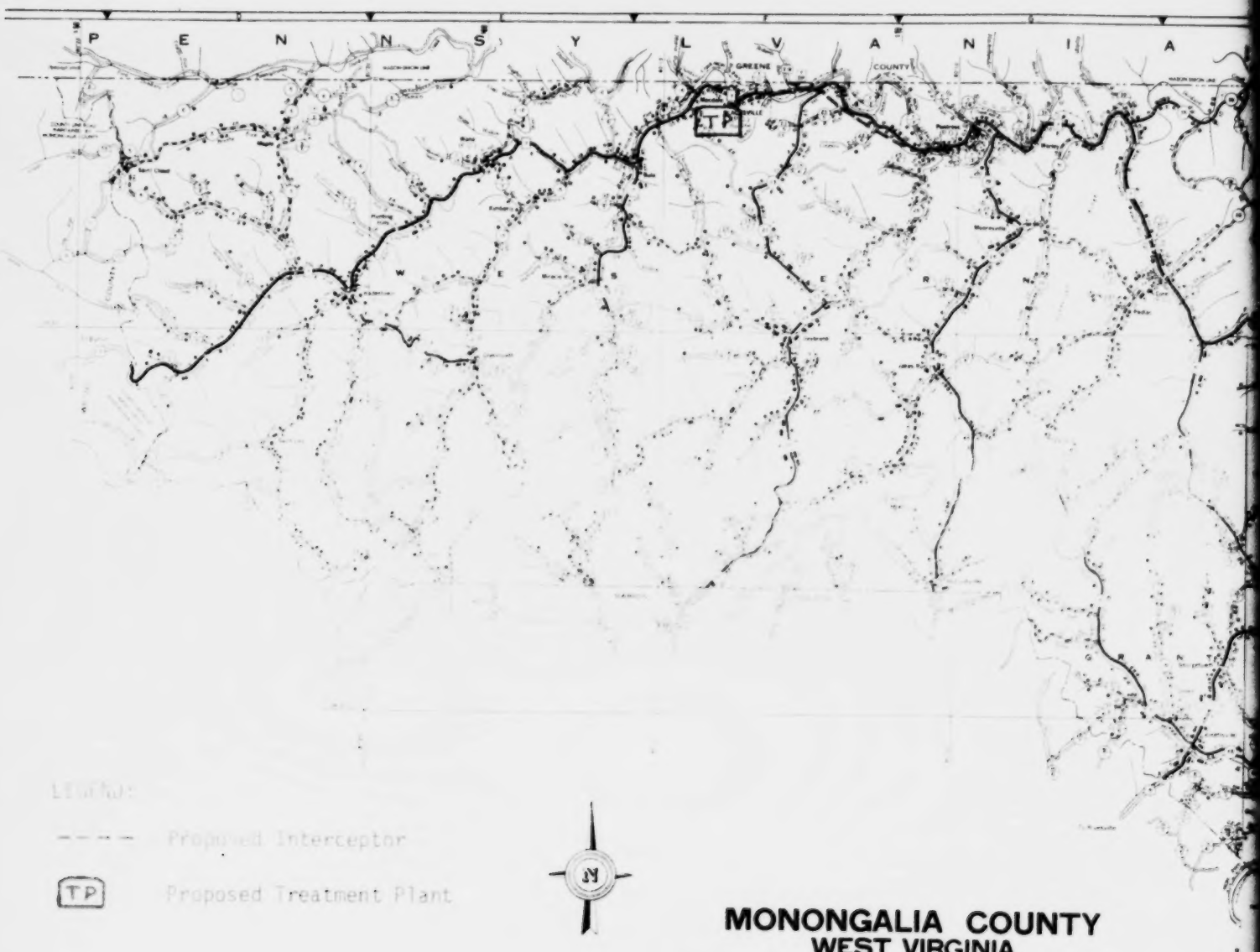
Priority 4 - Water Resources Division
West Virginia Department of Natural Resources
Charleston, West Virginia

Authority: Article 5A, Chapter 29
West Virginia Code

Priority 4 was given to Water Resources Division, Department of Natural Resources because this group is responsible for water quality and would be involved in approval of plans for any treatment facilities.

Priority 5 - Environmental Protection Agency
U.S. Department of the Interior
Washington, D.C.

Priority 5 was given to the Environmental Protection Agency because they have authority to approve applications for grants for wastewater treatment facilities.



LEGEND:

---- Proposed Interceptor

TP Proposed Treatment Plant

N

MONONGALIA COUNTY
WEST VIRGINIA

PREPARED BY
WEST VIRGINIA DEPARTMENT OF HIGHWAYS
ADVANCED PLANNING DIVISION

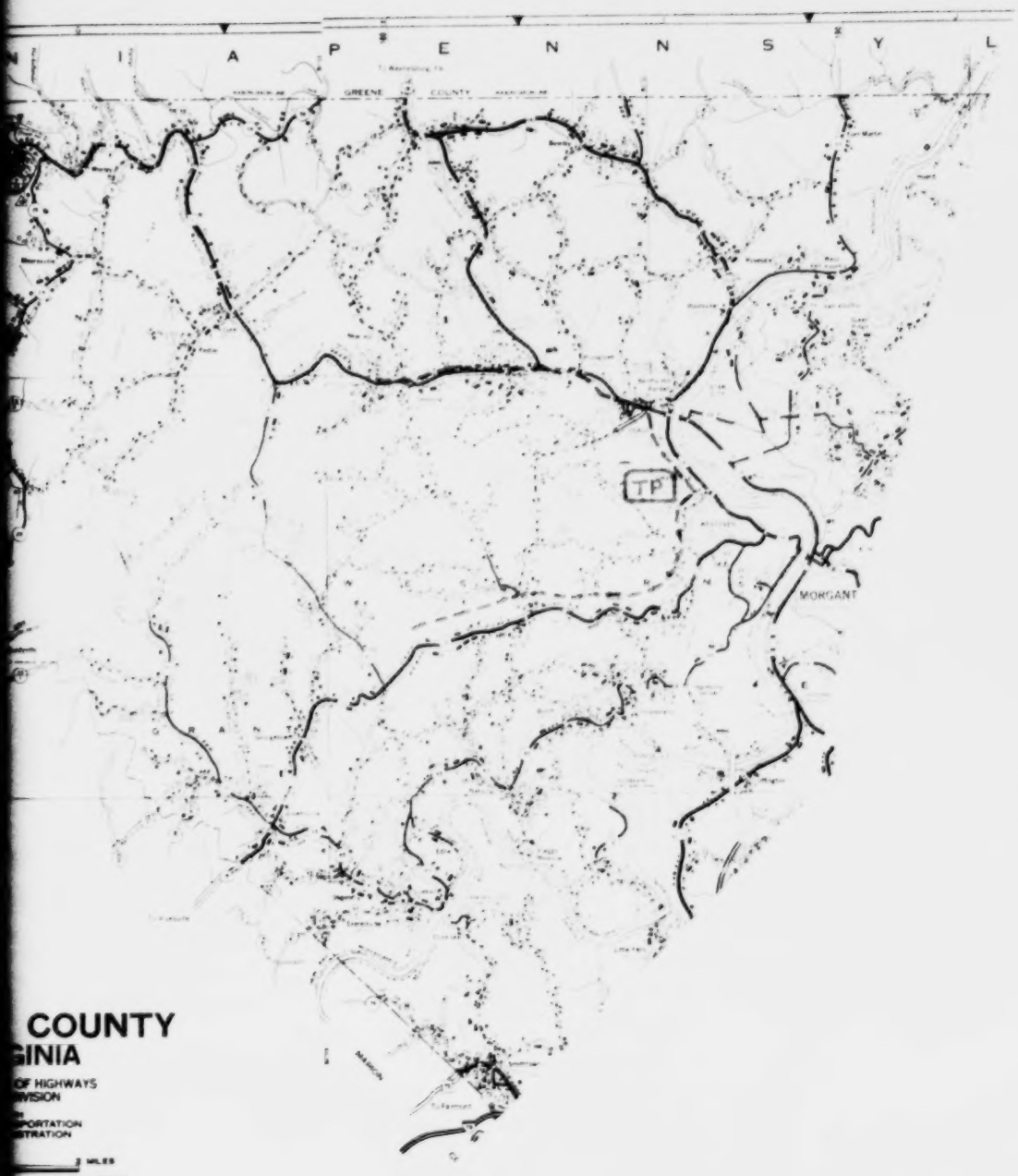
IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1 2 MILES

0 1 2 3 KILOMETERS

1966



SEWAGE COLLECTION AND TREATMENT
PLAN C
FIGURE 6

Government Responsibility - Continued

Priority 6 - Department of Housing and Urban Development
Washington, D.C.

Priority 6 was given to the Department of Housing and Urban Development since they have grants which can be given for collection systems.

Priority 7 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

Priority 7 was given to the Federal-State Relations Office since it is involved in any federal grants to the state.

Cost Estimates:

Initial Cost (Collection and Treatment)

Westover Treatment Plant and Interceptors (From Plan A)	$2,065,000
Blacksville Treatment Plant (400,000 GPD)	220,000
Engineering and Legal Fees	125,000
Interceptor - Blacksville to Prentress (4 miles)	442,400
Interceptor - Osage to Cassville (3 miles)	331,800
Total	$3,184,200

Sewage Collection & Treatment Department

Annual Operating Cost (9,000 People)

For Westover Plant (Plan A)	$ 80,100
Blacksville Treatment Salaries	19,500
Blacksville Maintenance Salaries	19,500
Materials & Supplies	2,000
Expense, Treatment Plant	4,000
Utilities	2,400
Equipment Depreciation	2,500
Office (Part-time)	5,000
Total	$135,000

Cost per Capita - - -$14.95

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Source of Funds:

1. Environmental Protection Agency, U.S. Department of the Interior, Washington, D.C. - for 30% at the present time.

2. Department of Housing and Urban Development Washington, D.C. - for Sewer Construction Grant.

3. Federal-State Relations Office, State Capitol, Charleston, West Virginia. This office would aid in the obtaining of grants for the project.

   Note: If the State of West Virginia financing plan for construction of sewers and treatment plants is implemented, the municipalities will be eligible for 25% state funding and 55% U.S. Government funding (EPA, HUD and ARC). The sanitary district would have to furnish 20%, which might be done through a bond election.

PLAN D - County Public Service District for Collection, Treatment and Disposal of Sewage in Monongalia County, West Virginia

This plan would encompass all the county treatment plants in a single public service district. It is intended that the two plants and interceptors proposed in Plan C for the western part of the county be supplemented by an enlarged Morgantown plant with an interceptor extended into the Cheat Lake area. This should include the largest portion of the population in the county, reaching and serving about 60,000 people including the 17,000 students at West Virginia University. This leaves about 19,000 people in the county who must depend on small package treatment systems or individual septic tank systems.

Recommended Program - Long-Range

Step 1 - The Monongalia County Public Service District would be established by the County Court of Monongalia County for the purpose of providing sewage collection and disposal in the county area west of the Monongahela River.

Step 2 - The City of Westover would appoint one member of the Public Service District Board. The City of Morgantown would appoint two members. The board would meet to select a chairman.

Step 3 - The two treatment plants and interceptors as recommended for Plan C would be used in this plan also. The Morgantown treatment plant would be enlarged and secondary treatment added. A new interceptor would be added from the Cheat Lake area to the Morgantown system as shown on Figure 7.

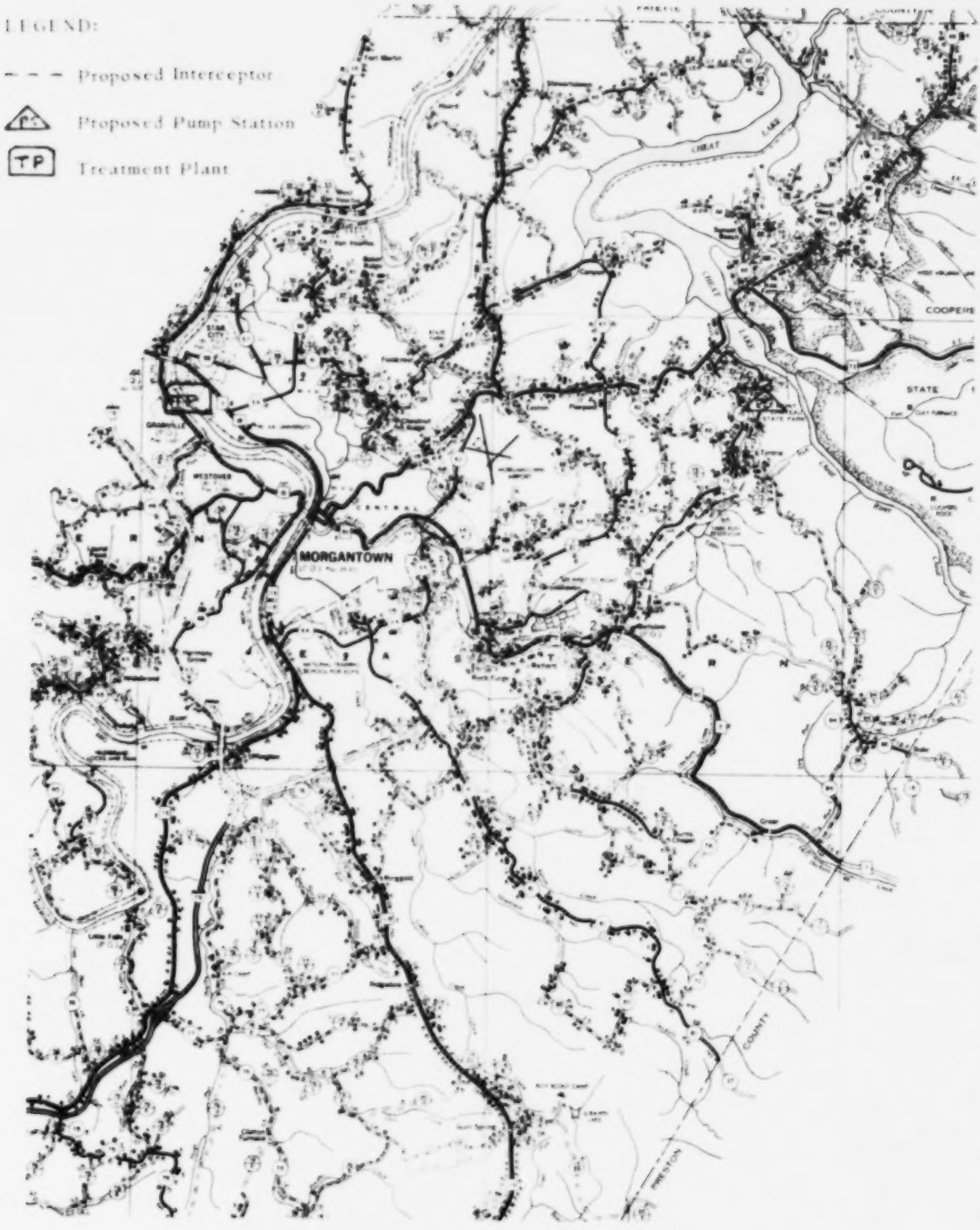


FIGURE 7 - SEWAGE COLLECTION AND TREATMENT
EASTERN MONONGALIA COUNTY

Recommended Program - Long-Range - Continued

Step 4 - Plans should be prepared by a consulting firm engaged by the district for treatment plants and interceptors at Blacksville and Westover, as well as the enlargement of the Morgantown plant and the added interceptor to the system.

Step 5 - Make definite requests for necessary grants and arrange for any other financing required to construct the systems.

Step 6 - Request bids on construction.

Step 7 - Construct plants and interceptors and begin operation.

Government Responsibility:

Priority 1 - County Court
Monongalia County

Authority: Chapter 16, Article 13A
Public Health Laws
West Virginia Code

Priority 1 was assigned to the County Court since this group must establish the public service district.

Priority 2 - West Virginia State Health Department
Charleston, West Virginia

Authority: Chapter 16, Article 1, Section 9
Public Health Laws
West Virginia Code

Priority 2 was given to West Virginia State Health Department because they are assigned primary responsibility for proper wastewater treatment in the cities of West Virginia. This department also has the laws for establishing sanitary districts and must approve all treatment facilities.

Priority 3 - Monongalia County Health Department
Morgantown, West Virginia

Authority: Chapter 16, West Virginia Code

Priority 3 was given to the Monongalia County Health Department since this group will be primarily responsible for implementing the State Regulations on the local level.

Priority 4 - Water Resources Division
West Virginia Department of Natural Resources
Charleston, West Virginia

Government Responsibility - Continued

Authority: Article 5A, Chapter 29
West Virginia Code

Priority 4 was given to Water Resources Division, Department of Natural Resources because this group is responsible for water quality and would be involved in approval of plans for any treatment facilities.

Priority 5 - Environmental Protection Agency
U.S. Department of the Interior
Washington, D.C.

Priority 5 was given to the Environmental Protection Agency because they have authority to approve applications for grants for wastewater treatment facilities.

Priority 6 - Department of Housing and Urban Development
Washington, D.C.

Priority 6 was given to the Department of Housing and Urban Development since they have grants which can be given for collection systems.

Priority 7 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

Priority 7 was given to the Federal-State Relations Office since it is involved in any federal grants to the state.

Priority 8 - Morgantown City Officials
Morgantown, West Virginia

Cost Estimates:

Initial Cost (Collection & Treatment)

Costs for Systems West of Monongahela River	$3,059,200
Morgantown Plant Enlargement - Primary	200,000
Morgantown Secondary Treatment Addition	2,000,000
Interceptor from Cheat Lake - 8 Miles	844,800
Pump Station	50,000
Engineering and Legal	500,000
Total Cost	$6,654,000

Cost Estimates - Continued

Sewage Collection & Treatment Department

Annual Operating Cost: (60,000 people)

Operating Costs - Western District (Plan C)- - - - - -	$ 135,000
Operating Costs - Morgantown Plant - - - - - - - - - -	663,850
Added Cost for Additional Service- - - - - - - - - - -	55,000
Total Operating Cost	$ 853,850

Cost per Capita - - - $14.20

Source of Funds:

1. Environmental Protection Agency, U.S. Department of the Interior, Washington, D.C. - for 30% at the present time.

2. Department of Housing and Urban Development Washington, D.C. - For Sewer Construction Grant.

3. Federal-State Relations Office, State Capitol, Charleston, West Virginia. This office would aid in the obtaining of grants for the project.

   Note: If the State of West Virginia financing plan for construction of sewers and treatment plants is implemented, the municipalities will be eligible for 25% state funding and 55% U.S. Government funding (EPA, HUD and ARC). The sanitary district would have to furnish 20%, which might be done through a bond election.

1.13 Recommendations - Sewage Collection and Treatment

Four plans were presented for the collection, treatment and disposal of sewage. Each plan will be summarized and one plan recommended as the best solution to the problem.

Plan A is to build a treatment plant in the Westover-Granville area to treat the sewage collected from these two cities, Osage and the rural areas along U.S. 19 southwest of Westover. It would serve about 7,000 people with a maximum capacity for 12,000 people or 1.2 million gallons per day. It would require that Westover assume the responsibility for the plant and operation and charge the other communities for service. This plan, along with some septic tank systems for rural homes, would cover the Dents Run area and the city of Osage.

Plan B is a plan whereby the same communities involved in Plan A collect their sewage and pump it through new interceptors across the Monongahela River to the Morgantown treatment plant. That plant would require enlargement to accomplish this plan and the addition of secondary treatment to the system. The plan would also involve getting the agreement of the Morgantown officials to enlarge the plant and accept the sewage for treatment.

Plan C would be to form a public service or sanitary district for that part of Monongalia County west of the river. This would include the Westover-Granville-Osage plant and collection systems plus a plant for the Blacksville-Pentress area and the addition of an area west of Osage to the Westover treatment system. This would give some treatment services to the western part of the county, but population is so scattered that it would only include about 46% of the people.

Plan D is a county-wide sanitary district. This would include the system proposed in Plan C plus enlarged Morgantown treatment facilities and an interceptor out to the Cheat Lake area. This would reach a majority of the people in the eastern part of the county, but only about half of those in the western part.

The cost for each plan is shown below:

Plan	Initial Cost	Operating Cost per Capita
Plan A - Westover Plant - Dents Run Area	$2,065,000	$11.45
Plan B - Dents Run Area with Morgantown Plant	2,300,000	10.25
Plan C - Western Monongalia County District	3,184,200	14.95
Plan D - Monongalia County District	6,654,000	14.20

From the cost figures shown above, it appears that the best solution would be Plan B, which calls for the Westover-Granville area to provide a collection system and pump all the sewage to an enlarged Morgantown treatment plant. This solution will be recommended as the best one to follow, but objections from Morgantown officials might be encountered and there might be legal problems involved. The possibility of a line across the river might cost much more than anticipated.

An alternate solution which could be used would be Plan A. Since part of the engineering has already been done, the initial cost would be less than that for Plan B, but the operating cost would still be about $1.00 per capita higher than Plan B.

The proposals presented in Plans C and D include a large area, but most of the people in the county live in the area immediately around Morgantown, so it would cost a lot of money to provide sewage treatment for the people scattered in the rural areas of the county.

1.2 Collection and Disposal of Solid Waste

The problem of solid waste collection and disposal exists not only for the cities of Westover and Granville, but also for the rural areas of Dents Run watershed. There is no sanitary landfill in operation in the watershed. Both cities are now hauling their solid waste over the river to the Morgantown landfill. This should be just a temporary solution, since Morgantown is not designed to support the extra influx of waste.

The people in the rural areas of the watershed must either haul to Morgantown's landfill or just dump indiscriminately along roads or strip mine areas.

It is proposed that the problem of solid waste in the area be solved by providing an approved sanitary landfill in the general area and establishing a system of rural collection to augment the collection in the cities in order to alleviate roadside dumping.

The economic benefits of using a sanitary landfill for disposal can be shown by a comparison with incineration. At this time, incineration is the only acceptable alternative to the sanitary landfill approach for solid waste disposal. Costs for incineration of refuse average up to $12.00 per ton when incinerators incorporate the air cleaning equipment to meet proper air pollution standards[1].

Assuming that collection costs for the waste would be equivalent for either method, the cost of the landfill operation can be compared directly with that for incineration. According to government reports[2], the costs for a sanitary landfill operation will vary up to approximately $2.25 per ton. The topography of the land affects the cost. A site in a ravine or canyon would be cheaper than one which required the cut and cover method. The size of the population served affects the cost. At two sites in Allegany County, Maryland, one showed an average cost of $2.22 per ton. The second site, which handled about 3 times as much material as the other, showed an average cost of $1.34 per ton. Another landfill, located in Chilton County, Alabama, reflected a unit operating cost of $2.06 per ton, so there is an economic benefit in using the sanitary landfill method for solid waste disposal.

Four different plans will be considered. These plans are as follows:

A. The towns of Granville and Westover will collect their solid waste, haul it independently to the Morgantown Sanitary Landfill and pay the charges established by the Morgantown city officials.

B. Establish a public service district to provide complete solid waste collection and disposal operation. District will include the Dents Run area and the town of Osage.

C. Establish a public service district to provide a complete solid waste collection and disposal operation for all of Monongalia County west of the Monongahela River.

D. Establish a public service district to provide complete solid waste collection and disposal operation. This district would include all of Monongalia County.

Each of the plans will be discussed in detail in the following pages. One of the plans will be recommended as the specific plan to be implemented in the Dents Run area.

PLAN A - The Towns of Granville and Westover Will Collect the Solid Waste, Haul it to the Morgantown Sanitary Landfill and Pay the Charges for Disposal Established by Morgantown Officials

This is the plan that is currently being employed. However, Morgantown landfill operators give their own city trucks priority, causing the Westover and Granville trucks to sometimes wait one or two hours to unload. They must also drive across Morgantown through the heavy traffic, which delays them considerably at times. Morgantown will not accept large, heavy items, such as refrigerators, ranges or washers, so another source must be located to dispose of these types of waste. We were informed by the Mayor of Westover that this service is costing the city more than is being received from the collection fees, and the excess is being paid from the general fund of the city. It appears that Morgantown's charges to other cities may be less than their cost of operation for the waste disposal.

No collection is being made in the rural area except from a few houses along Route 19, which are on the normal route of the collection trucks. Rural collection should be added for the Dents Run area. This will probably not be done as long as each city is operating under this plan, because the city would not be financially able to provide the personnel and equipment to maintain such service.

Recommended Program - Long-Range

Step 1 - Management personnel of each city should re-evaluate their collection charges and make necessary adjustments to bring income above expenses for the sanitary operation. Charges for commercial firms should be higher than that for residences.

Step 2 - Locate salvage yard which will accept large items, such as appliances. Negotiate costs for disposal and include such costs in city expenses and reflect this by specific charges for collection of such items.

Step 3 - Publish and put into effect new rates as determined by evaluation in Step 1.

Government Responsibility:

1. Mayor and City Council, City of Westover
2. Mayor and City Council, City of Granville

Cost Estimates:

The income to the City of Westover from charges to residents for collection of solid waste is about $20,000 per year. This is received from a charge of $16.00 per year to about 1,200 to 1,250 homeowners. Income for Granville is about $3,750 per year from approximately 250 accounts.

Westover Cost Estimate - 4,550 Tons:

20 Truckloads/Week @ $5.00 per Load Charge Annual Cost	$ 5,200
4 People to Operate Trucks @ $2.77/ hr. avg.	22,200
Depreciation on 2 Trucks - 10 yrs. @ 5%	3,000
Operating Costs - Fuel & Maintenance	1,800
Total Annual Cost	$31,400

Cost per ton - $6.89
Cost per Capita - $6.15

Granville Cost Estimate - 850 Tons

Based on Population - 2 loads per week	$ 520
2 Operators (part-time)	5,000
Depreciation on 1 Truck - 6 Years	1,500
Operating Cost - Fuel & Maintenance	500
Total Annual Cost	$7,520

Cost per ton - $8.87
Cost per Capita - $6.91

PLAN B - Establish a Public Service District to Provide a Complete Collection and Disposal Operation. The District Will be Dents Run Area and the Town of Osage.

This plan for corrective action is essentially the establishment of a public service district to administer the solid waste collection and disposal for the cities of Westover and Granville, as well as the rural areas of Dents Run watershed and the town of Osage. Osage is just north of the Dents Run boundary and is now hauling to Morgantown landfill for the solid waste disposal of its 600 residents. This district would cover an area of approximately 15 square miles and serve about 7,300 people.

Recommended Program - Long-Range

Step 1 - Under the authority of Chapter 16, Article 13A-2, Code of West Virginia, a Dents Run public service district would be established by the County Court of Monongalia County for the purpose of providing solid waste collection and disposal in the Dents Run area and the town of Osage.

Recommended Program - Long-Range - Continued

Step 2 - The City of Westover would appoint one member of the Public Service District Board. The County Court would appoint two additional members. The Board would meet to select a chairman.

Step 3 - Preliminary approval would be obtained for proposed site from the State Health Department. Proposed site is a 40-acre tract on Strip Mine H, Section C as shown in Figure 8. This site will have a life of 20 years, allowing for 25% growth in the area. The site would accommodate 14,000 to 16,000 cubic yards of waste per acre each year.

If the Hess borehole is still discharging fluid, the water will need to be drained around the landfill site. However, plans are under way to close this borehole and let all the fluid be discharged from a lower point where treatment will be provided.

Step 4 - Retain the services of a registered professional engineer to prepare plans for the establishment of a sanitary landfill and a rural collection system to supplement the existing city routes. This would involve the district obtaining a compactor truck and 15 three-cubic-yard containers adaptable for use with the truck purchased. These containers would be placed on the rural roads in the Dents Run area. Plans would also include collection of waste from the residents of Osage. The use of 15 containers would permit strategic placement of the containers so that no rural resident would have to travel over one mile to dump his trash in one of the trash boxes. This would be more conducive than driving into an isolated strip mine to dump indiscriminately. Location of the containers in the rural areas is shown on the map, Figure 8.

Step 5 - Submit plans and application to State Health Department for approval.

Step 6 - Arrange for necessary financing in accordance with costs projected by the engineer for initial and annual costs. Establish charges for waste collection and publish for approval.

Step 7 - After plan and financing approval, obtain the money and buy necessary equipment.

Step 8 - Publicize plans, showing location for rural collection boxes and hours set for acceptance of trash at landfill site.

Recommended Program - Long-Range - Continued

Step 9 - Prepare landfill site and access roads.

Step 10 - Have the finished site inspected for approval by the State Health Department.

Step 11 - Distribute containers in rural areas at the designated locations. Commence operation or rural collection and landfill operation.

Government Responsibility:

Priority 1 - County Court
Monongalia County

Authority: Chapter 16, Article 13A
Public Health Laws
West Virginia Code

Priority 2 - West Virginia State Health Department
Solid Waste Section
Charleston, West Virginia

Authority: Chapter 16, Article 1, Section 9
Public Health Laws
West Virginia Code

Priority 3 - Monongalia County Health Department
Morgantown, West Virginia

Authority: Chapter 16, Article 1
West Virginia Code

Priority 4 - Department of Health, Education & Welfare
Washington, D.C.

Authority: Solid Waste Disposal Act

Priority 5 - Appalachian Regional Commission
Washington, D.C.

Priority 6 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

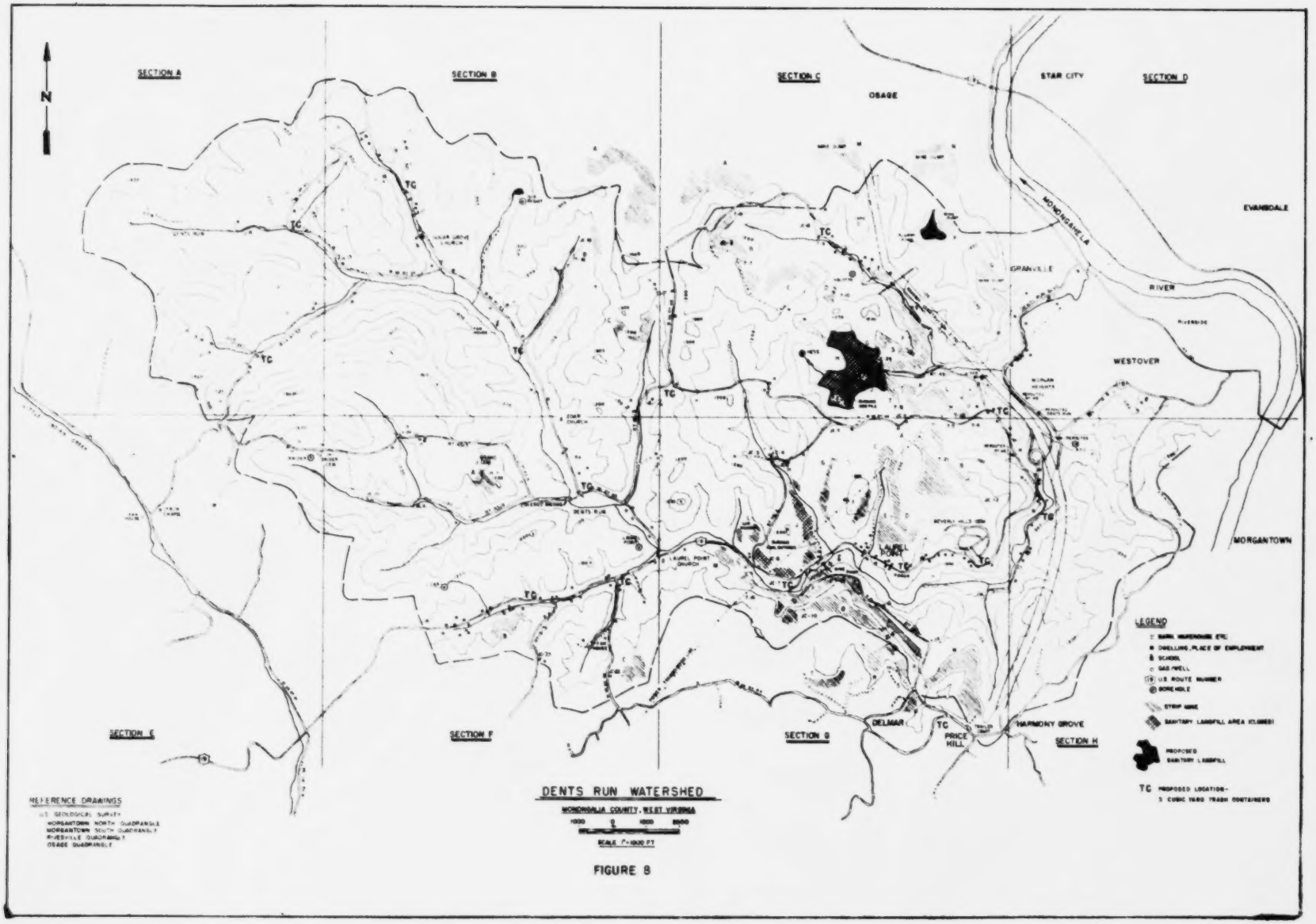

SECTION A
SECTION B
SECTION C
SECTION D
SECTION E
SECTION F
SECTION G
SECTION H
N
STAR CITY
OSAGE
EVANSDALE
GRANVILLE
WESTOVER
MORGANTOWN
DELMAR
PRICE HILL
HARMONY GROVE
MONONGAHELA RIVER
TC
LEGEND
SCHOOL
GAS WELL
BOREHOLE
STRIP MINE
PROPOSED SANITARY LANDFILL
TC PROPOSED LOCATION-
3 CUBIC YARD TRASH CONTAINERS
REFERENCE DRAWINGS
U.S. GEOLOGICAL SURVEY
MORGANTOWN NORTH QUADRANGLE
MORGANTOWN SOUTH QUADRANGLE
OSAGE QUADRANGLE
DENTS RUN WATERSHED
MONONGALIA COUNTY, WEST VIRGINIA
SCALE 1"=1000 FT

FIGURE 8

Cost Estimates:

Initial Cost:

Land - 40 acres @ $300 per acre	$12,000
Engineering Fees	7,000
Site Preparation	8,000
Truck-Compactor with Lifter Device	10,000
Trucks - Used (3)	12,000
15 Containers (3 cu. yd.) @ $200 ea.	3,000
Equipment - Landfill Tractor	40,000
Total	$92,000

Operating Cost per Year - 6,300 Tons - Collection & Disposal:

Labor Costs (5 operators, 5 helpers)	$55,100
Fuel & Supplies	7,200
Utilities & Miscellaneous	1,200
Equipment Depreciation - 10 Years	6,900
Equipment Maintenance	5,000
Supervisory & Office Overhead	4,000
Total	$79,400

Operating Cost per Ton - - - - $12.60

Cost per Capita- - - - - - - - $10.85

Source of Funds:

1. Department of Health, Education and Welfare, Washington, D.C. Grants for construction of sanitary landfill facilities may be available from this agency.

2. Environmental Protection Agency, Washington, D.C. Grants may possibly be available from EPA.

3. Farmers Home Administration, Washington, D.C. Some money may be available from FHA for help in this project.

4. Appalachian Regional Commission, Washington, D.C. The balance of the costs, up to 80%, can possibly be furnished by this agency. Up to 50% of the operating costs for the first two years can be requested from the Appalachian Regional Commission.

   Note: The Dents Run Public Service District would have to furnish the 20% balance of the funds for initial cost or about $19,200. This could come from a bond election or by a loan.

PLAN C - Establish a Public Service District to Provide a Complete Solid Waste Collection and Disposal Operation. District Will Include All of Monongalia County, West Virginia West of the Monongahela River

This plan is similar to Plan B except that it includes a much larger area and would serve almost 3 times the number of people. The part of the county west of the river would cover 131,367 acres, or 205 square miles, and serve about 19,500 people.

Recommended Program - Long-Range

Step 1 - The Western Monongalia County Public Service District would be established by the County Court of Monongalia County for the purpose of providing solid waste collection and disposal in the county area west of the Monongahela River.

Step 2 - The City of Westover would appoint one member of the Public Service District Board. The County Court would appoint two additional members. The board would meet to select a chairman.

Step 3 - Select two sites for establishment of sanitary landfill. One proposed site is a 40-acre tract on Strip Mine H, Section C, as shown on Figure 8. This site will have a life of 15 years if half the district area is served. The site would accommodate 14,000 to 16,000 cubic yards of waste per acre each year. The other proposed site would be in an area southwest of Blacksville. The approximate location is shown on Figure 9. The exact site location would have to be determined by registered engineers retained upon activation of this plan, since this area is out of the scope of the investigation covered in this contract. It should be at least 40 or 50 acres in size.

Step 4 - Obtain preliminary approval of the two proposed sites.

Step 5 - Proceed with plans for the two landfills and for rural collection in each area served. A rural route should be established from each sanitary landfill, using a compactor truck and 3-cubic-yard containers for use with the truck. The route for the truck from the Laurel Point area landfill should include collection points in the rural areas of the Grant District and the communities of Booth, National, Edna, Lowsville, Everettville, Fort Grand, Crown and Arnettsville. It should also include the area of the Cass District between the river and I-79 and the communities along Route 7 in the southern part of the district. This would require about 35 containers in order for the rural residents to have a container within one mile of their residence. An in-town

Step 5 - Continued

collection should be made in Osage and Price Hill-Harmony Grove community.

The rural route for the truck of the sanitary landfill near Blacksville would cover the Batelle and Clay districts, as well as the remaining portion of the Cass district. This would be a larger area to cover but would only include about 40% of the people in the entire public service district. This would require a compactor truck and about 30 containers. Collection should be made in the communities of Blacksville and Pentress and perhaps at the congested areas on Route 7.

Location of the rural trash collection containers for the western part of the county are shown on Figure 9 and designated by the letters TC.

Step 6 - Submit plans and application to State Health Department for approval.

Step 7 - Arrange for necessary financing in accordance with costs projected by the engineering firm for initial and annual costs. Establish charges for collection, where applicable, and publish.

Step 8 - After plan and financing approval, obtain the money and buy necessary equipment.

Step 9 - Publicize plans, showing location for rural collection boxes and hours set for acceptance of trash at landfill site.

Step 10- Prepare the two landfill sites and access roads.

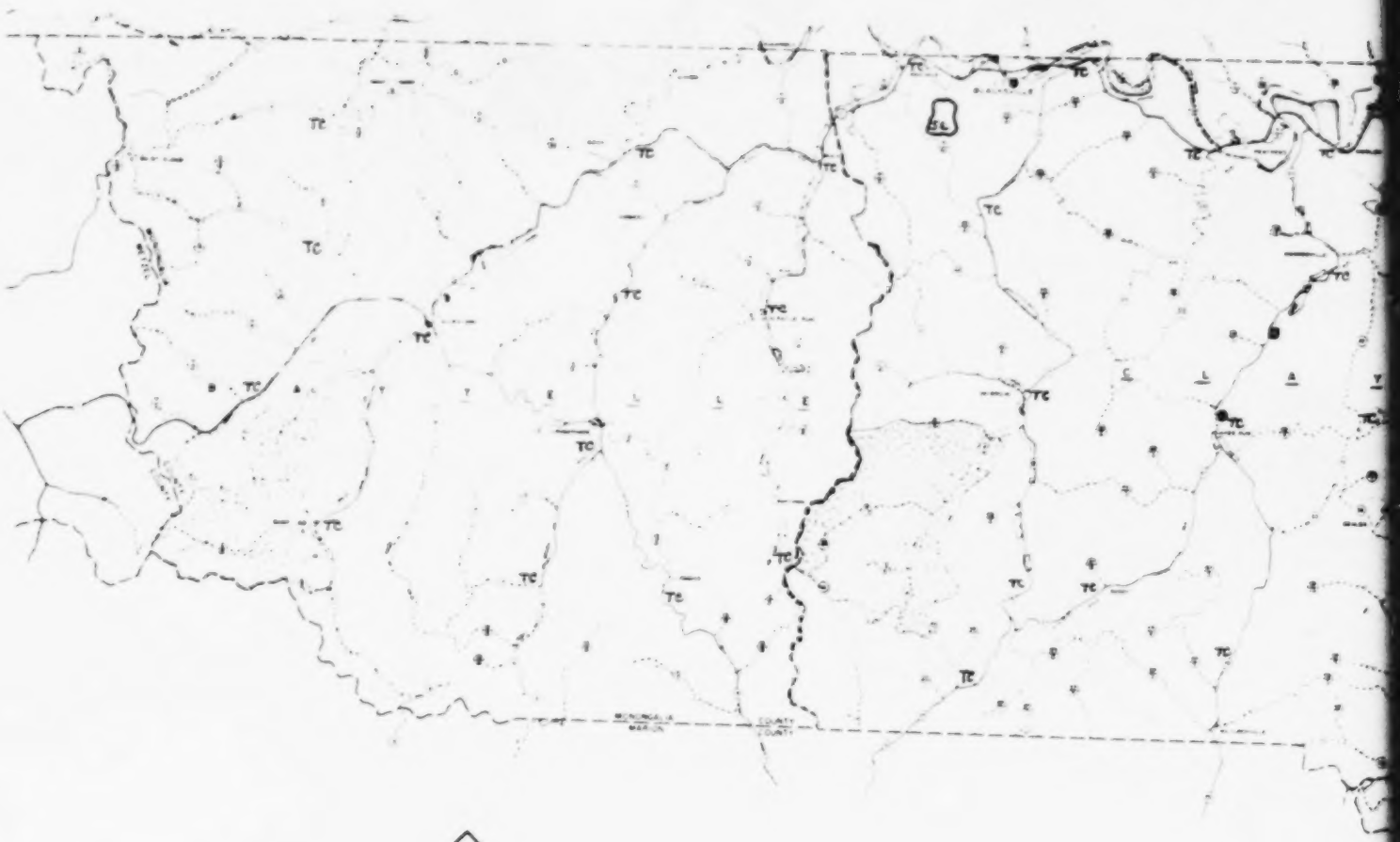
Step 11- Have the finished site inspected for approval by the State Health Department.

Step 12- Distribute containers in rural areas at the designated locations. Begin collection and landfill operation.

Government Responsibility:

Priority 1 - County Court
Monongalia County

Authority: Chapter 16, Article 13A
Public Health Laws
West Virginia Code



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LEGEND:

SL – Proposed location for Sanitary Landfill.

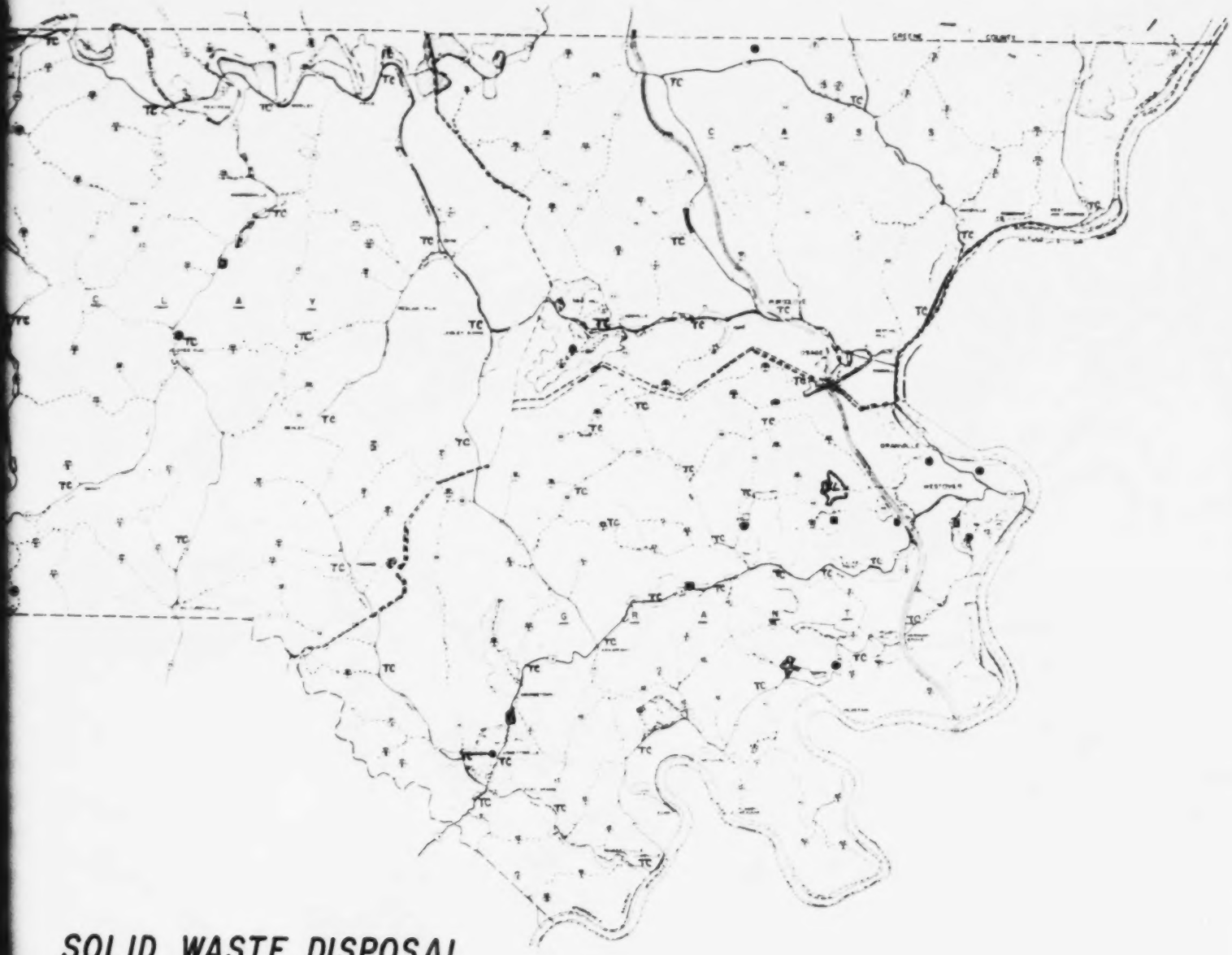
TC – Proposed location for 3 cubic yard Trash Containers.

SOLID WASTE D

PLAN C

WESTERN MONONGALI
PUBLIC SERVICE DIS

SCALE: 3/4"= 1



SOLID WASTE DISPOSAL

PLAN C

WESTERN MONONGALIA COUNTY
PUBLIC SERVICE DISTRICT

SCALE: 3/4"= 1 MILE

FIGURE 9

Government Responsibility - Continued

Priority 2 - West Virginia State Health Department
Solid Waste Section
Charleston, West Virginia

Authority: Chapter 16, Article 1, Section 9
Public Health Laws
West Virginia Code

Priority 3 - Monongalia County Health Department
Morgantown, West Virginia

Authority: Chapter 16, Article 1
West Virginia Code

Priority 4 - Department of Health, Education & Welfare
Washington, D.C.

Authority: Solid Waste Disposal Act

Priority 5 - Appalachian Regional Commission
Washington, D.C.

Priority 6 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

Cost Estimates:

Initial Cost	
Land - 80 acres @ $300/acre	$ 24,000
Engineering Fees	15,000
Preparation of Sites	16,000
Equipment - Packer Trucks, Used (4)	16,000
Landfill Tractors (2)	80,000
Packer Truck (New)	10,000
3-cu. yd. Containers (65)	13,000
Total Initial Cost	$174,000

Annual Operating Cost - 17,150 Tons - Collection & Disposal	
Labor Costs - 7 Operators, 7 Helpers	$ 77,700
Fuel & Supplies	9,600
Utilities & Miscellaneous	2,400
Equipment Depreciation - 10 years	12,300
Equipment Maintenance	6,000
Supervisory & Office Overhead	12,000
Total Annual Cost	$120,000

Cost per Ton - - - $7.00
Cost per Capita- - $6.15

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Source of Funds:

1. Department of Health, Education and Welfare, Washington, D.C. Grants for construction of sanitary landfill facilities may be available from this agency.

2. Environmental Protection Agency, Washington, D.C. Grants may possibly be available from EPA.

3. Farmers Home Administration, Washington, D.C. Some money may be available from FHA for help in this project.

4. Appalachian Regional Commission, Washington, D.C. The balance of the costs, up to 80%, can possibly be furnished by this agency. Up to 50% of the operating costs for the first two years can be requested from the Appalachian Regional Commission.

   Note: The Dents Run Public Service District would have to furnish the 20% balance of the funds for initial cost or about $35,000. This could come from a bond election or by a loan.

PLAN D - Establish a Public Service District for all of Monongalia County to Provide Complete Solid Waste Collection and Disposal

This plan encompasses Plan C for the western part of Monongalia County and the balance of the county east of the Monongahela River, including the city of Morgantown. This district would cover an area of 364 square miles and serve about 62,469 people. Should the city of Morgantown not wish to be a part of the district, which is their right guaranteed by Article 16-13A-2 of the West Virginia Code, the district would include all of the county except the city of Morgantown. This would cover an area of 357 square miles, but only serve about 33,400 people.

Plan D will be presented with the assumption that the city of Morgantown will become a part of the county-wide public service district, but that West Virginia University would operate separately within the district and continue to use the Morgantown landfill for disposal.

Recommended Program - Long-Range

Step 1 - The Monongalia County Public Service District would be created by the County Court for the purpose of providing solid waste collection and disposal in the county.

Step 2 - The City of Morgantown would appoint two members to the district board. The city of Westover would appoint one member to the board.

Recommended Program - Long-Range

Step 3 - Besides the two proposed sanitary landfill sites in the western half of the county proposed in Plan C, two sites will be required for the eastern part of the county. One site will be the existing Morgantown landfill or the new landfill site already proposed to the State Health Department for approval. The other proposed site would be southeast of Morgantown near the lower boundary of the Morgan magisterial district. The exact size would have to be determined by consulting engineers hired upon activation of this plan, since this area is out of the scope of work included in the present contract, but one proposed site is shown on Figure 10.

Step 4 - Obtain preliminary approval of the second proposed site.

Step 5 - Proceed with plans for the landfills. Make final selections for location of trash receptacles in the rural areas. Establish a rural route for each landfill, using a compactor truck and 3-cubic-yard containers made for use with the truck. The route from the northern landfill (Morgantown) should cover the upper part of the eastern side north of Route 7 and 92. The southernmost landfill route should include all the portion east of the river and south of Routes 7 and 92. The two routes would require about 55 3-cubic-yard containers. Location of the trash collection containers for the eastern part of the district are shown on Figure 10 and designated by the letters TC. These are in addition to the 65 containers required in the western half of the county.

Step 6 - Submit plans and application to the State Health Department.

Step 7 - Arrange for necessary financing in accordance with costs projected by the engineering firm for initial and annual costs. Establish charges for collection, where applicable, and publish.

Step 8 - After plan and financing approval, obtain the money and buy necessary equipment.

Step 9 - Publicize plans, showing location for rural collection boxes and hours set for acceptance of trash at landfill site.

Step 10- Prepare the two landfill sites and access roads.

Step 11- Have the finished site inspected for approval by the State Health Department.

Step 12- Distribute containers in rural areas at the designated locations. Begin collection and landfill operation.

Government Responsibility:

Priority 1 - County Court
Monongalia County

Authority: Chapter 16, Article 13A,
Public Health Laws
West Virginia Code

Priority 2 - West Virginia State Health Department
Solid Waste Section
Charleston, West Virginia

Authority: Chapter 16, Article 1, Section 9
Public Health Laws
West Virginia Code

Priority 3 - Monongalia County Health Department
Morgantown, West Virginia

Authority: Chapter 16, Article 1
West Virginia Code

Priority 4 - Department of Health, Education & Welfare
Washington, D.C.

Authority: Solid Waste Disposal Act

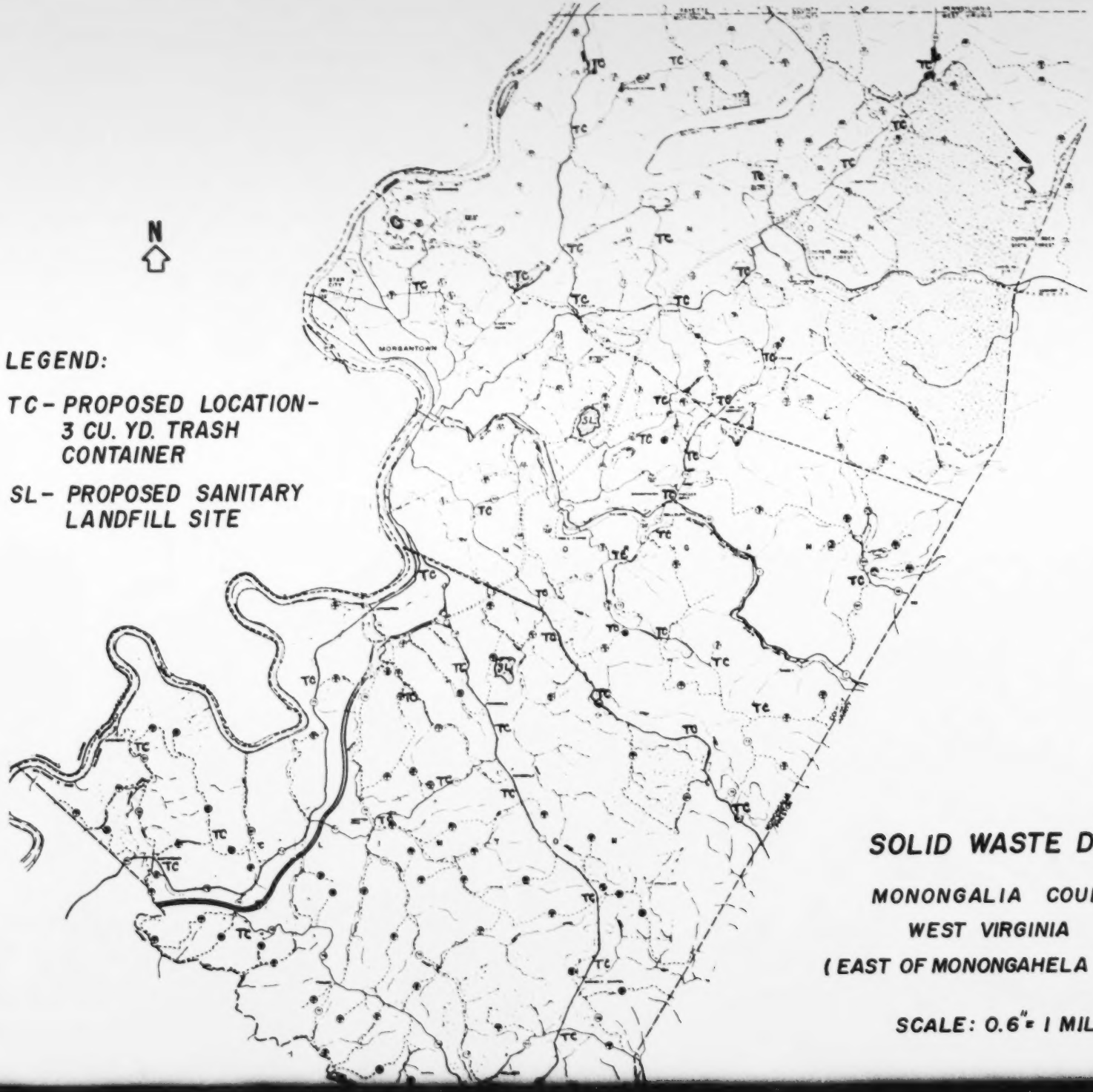
Priority 5 - Appalachian Regional Commission
Washington, D.C.

Priority 6 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

Cost Estimates:

Initial Cost:

Land - 160 Acres @ $300.00 per acre	$ 48,000
Engineering Fees	30,000
Preparation of Sites (4)	20,000
Landfill Tractors (4)	160,000
Packer Trucks, New (2)	20,000
Packer Trucks, Used (11)	44,000
Containers (3 cu. yd.) (110)	22,000
Total	$344,000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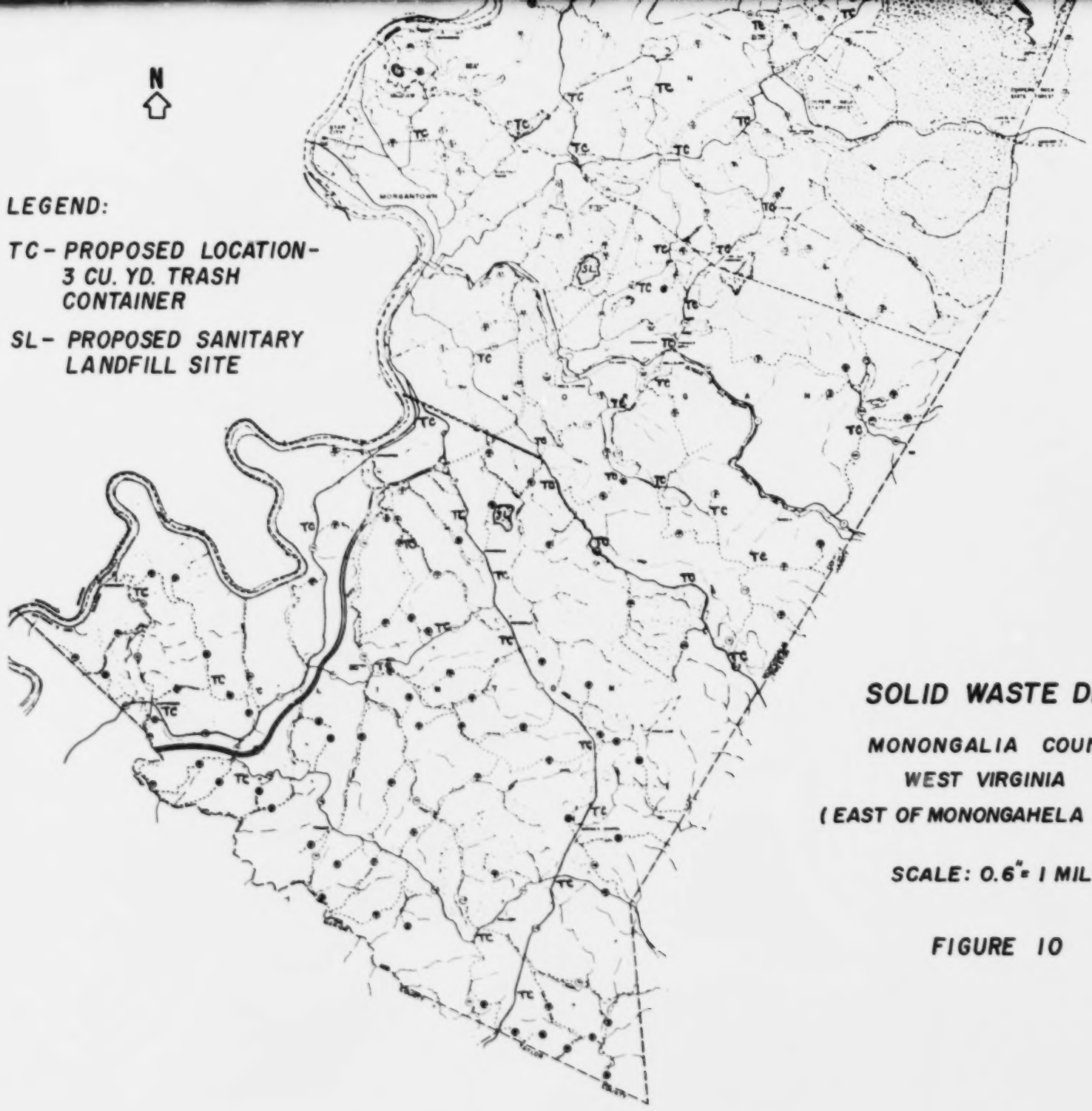
LEGEND:
TC - PROPOSED LOCATION - 3 CU. YD. TRASH CONTAINER
SL - PROPOSED SANITARY LANDFILL SITE
MORGANTOWN
SOLID WASTE DISPOSAL
MONONGALIA COUNTY
WEST VIRGINIA
(EAST OF MONONGAHELA RIVER)
SCALE: 0.6" = 1 MILE



SOLID WASTE DISPOSAL

MONONGALIA COUNTY
WEST VIRGINIA
(EAST OF MONONGAHELA RIVER)

SCALE: 0.6" = 1 MILE

FIGURE 10

Cost Estimates - Continued

Annual Operating Cost - 54,635 Tons - Collection & Disposal

Labor Costs (for 13 Trucks & 4 Landfills)- - - - - - - -	$221,000
Fuel & Supplies- -	24,000
Utilities & Miscellaneous Expenses - - - - - - - - - - -	32,300
Equipment, Depreciation - 10 Years - - - - - - - - - - -	24,000
Equipment Maintenance- - - - - - - - - - - - - - - - - -	12,000
Supervisory & Office Overhead- - - - - - - - - - - - - -	26,000
Total	$339,300

Cost per Ton - - - - $6.21
Cost per Capita- - - $5.41

Source of Funds:

1. Department of Health, Education and Welfare, Washington, D.C. Grants for construction of sanitary landfill facilities may be available from this agency.

2. Environmental Protection Agency, Washington, D.C. Grants may possibly be available from EPA.

3. Farmers Home Administration, Washington, D.C. Some money may be available from FHA for help in this project.

4. Appalachian Regional Commission, Washington, D.C. The balance of the costs, up to 80%, can possibly be furnished by this agency. Up to 50% of the operating costs for the first two years can be requested from the Appalachian Regional Commission.

   Note: The Dents Run Public Service District would have to furnish the 20% balance of the funds for initial cost or about $70,000. This could come from a bond election or by a loan.

1.21 Recommendations - Solid Waste Disposal

Four plans were presented for disposing of solid waste in the Dents Run area. Each plan will be discussed and one plan recommended as the solution to the problem.

Plan A is the continuation of the present policy by the cities of Granville and Westover. This would require no investment since each city already has a collection system in operation. However, some adjustment in service charges would need to be made (or a reduction in expense of collection) for the system to be self-supporting. There are two major discrepancies in this plan. Large bulky items, such as junk appliances, will not be accepted

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by the Morgantown landfill operators. This involves separate hauling of this type of waste with additional costs. This plan does not provide for rural collection, so a solution to the problem of indiscriminate dumping is not presented.

Plan B would enlarge the concept to include the Dents Run watershed plus the adjacent town of Osage. A public service district would be organized to include the towns of Granville, Westover and Osage, with a collection system for all the rural areas. A sanitary landfill is proposed on a strip mine area north of Laurel Point. This district would cover 15 square miles and serve about 7,300 persons. Although this plan does offer collection and disposal for all residents of the area, costs are high for the service and this must be passed along to the residents in higher service charges. It is felt that the indiscriminate dumping will be eliminated by providing suitable containers at strategic sites throughout the area.

Plan C is an enlargement of the public service district to cover the 205 square miles in Monongalia County west of the Monongahela River. This district would serve about 19,500 people and provide both urban and rural collection of waste, as well as operation of two sanitary landfills for proper waste disposal. Costs are improved in this plan over the two previous plans. This could be an acceptable plan since all requirements are met for suitable waste collection and approved waste disposal. Selection must then be made on the basis of economic advantage to other plans.

Plan D is a county-wide approach to the solid waste problem. The public service district for Monongalia County would cover 364 square miles and serve approximately 62,469 people. It would include the city of Morgantown, which already has an established collection system and operates the only approved sanitary landfill in the county. This plan would provide both rural and urban collection for all the county and approved disposal in four sanitary landfills. This plan has all the advantages of Plan C, yet provides a lower cost for collection and disposal than the other plans presented.

Collection and Disposal Costs

	Per Ton	Per Capita
Plan A (Westover)- - - - - - - - - -	$ 6.89	$ 6.15
(Granville) - - - - - - - - -	8.87	6.91
Plan B (Dents Run Area)- - - - - - -	12.60	10.85
Plan C (Western Monongalia County) -	7.00	6.15
Plan D (Monongalia County) - - - - -	6.21	5.41

Based on the above discussion and the economic advantage shown in the cost figures, it is recommended that the solid waste problem in the Dents Run area be solved by the acceptance of Plan D. This plan will provide not only for a satisfactory solution in the Dents Run area, but also in the balance of the county as well, extending this benefit to over 62,000 people rather than the 7,300 in the Dents Run watershed.

1.3 Collection and Disposal of Junk Cars

Scattered throughout the entire watershed are junk car bodies which have been stripped of wheels, motor and drive components before being abandoned. Some are on inactive strip mines, some are along roadways and others are on private property. The car accumulations vary in quantity from one to thirty cars at each location, other than in the private salvage lots. The field survey disclosed about 85 cars or car bodies in the watershed area, excluding those in salvage lots. In virtually every case, the car body that has been abandoned is worthless from a monetary standpoint, but provides ideal locations for rodent population.

Several problems exist in the collection and disposition of the car bodies. First is the existing laws of West Virginia (Chapter 17, Article 24 of the West Virginia Code). Section 17-24-6 prescribes that the owner of the vehicle must be notified and given opportunity to reclaim the vehicle, or, if ownership cannot be determined, legal notices must be published. Although Section 17-24-5 provides authority for law enforcement agencies to take the abandoned vehicles into custody, there are no funds available to hire persons or equipment to collect the vehicles, and the resale value of the vehicle is insufficient to recover any costs incurred. Therefore, law enforcement officials will not initiate any action to remedy the situation.

However, there is a provision in Section 17-24-10(e) which states that any person, the State or any county in West Virginia may dispose of a vehicle directly to a demolisher, without title and without notification, if the vehicle is nine years old or older and has no engine or is totally inoperative. Many of the abandoned car bodies in the area will fall under this provision.

There is a program being organized by the Governor of West Virginia to collect all the abandoned vehicles over the State, compact them and then recycle the steel in the body. A grant for 75% of the program cost has been given to the State by the Appalachian Regional Commission for the program and the State will furnish the other 25% through cash and services.

There is an organization called "Mountaineers for Rural Progress" whose aim is to improve the aesthetic value of West Virginia. They have drawn up guidelines for a program to help locate abandoned vehicles and junk cars in each county. Their plan is for assistance to the Governor's junk car program. Essentially, their plans call for volunteers to help locate cars, try to determine ownership and mark the cars to be picked up for transporting to a disposal site or compactor. The Governor's plan uses personnel of the Department of Public Safety, State Police, Department of Highways and the National Guard.

The intent of the Governor's program is to find the cars, obtain waiver from the owner, move cars to a central temporary storage area and then have engines and transmission removed and the car flattened. These would then be moved by bid process to a place for recycling.

It can hardly be affirmed that a program to clear the countryside of eyesores like junk cars can be economically justified. While it is true

that such cars can provide a health hazard by sheltering rat populations, it is equally hard to place a dollar value on this aspect. The return in steel prices for the salvaged car bodies is only about $21.00 each, which will not meet the costs involved in finding the car, determining ownership, acquiring rights, compacting the car and hauling it to a shredder. In view of these facts, we must realize that the costs for a clean America must be met by the general public and the government working together.

Recommended Program - Long-Range

Step 1 - Attempt to have legislation presented to the State Legislature to simplify detitling procedures for abandoned vehicles and provide some means of removing such cars for disposal.

Step 2 - Concurrently with Step 1, a convenient collection point should be chosen in a flat area of sufficient size to accomodate the compacting equipment and a minimum of 500 cars. Arrangements should be made to lease the site. An area near Granville or Westover which is readily accessible to truck transportation would be satisfactory. This should probably be selected with the idea that cars from all over Monongalia County might be brought to this collection point to accumulate the 500-car minimum.

Step 3 - Personnel of the State Police should contact owners who can be located for cars which are listed in Table 1 and shown on Figure 4. A waiver should be obtained from these owners.

Step 4 - Furnish waivers to the Department of Highways for removing cars to collection point. The car removal could then be done by the County Road Maintenance Division.

Step 5 - When approximately 500 vehicles are in the collection area, a mobile team from the state will dismantle engines and transmission and compact the cars.

Step 6 - Receive bids from private sources for moving the compacted vehicles to a shredder for recycling the steel. Accept low bidder and dispose of the cars.

Government Responsibility:

Priority 1 - West Virginia Department of Public Safety
Charleston, West Virginia

This agency has been given primary responsibility in the Governor's plan for locating junk cars and obtaining the necessary waivers.

Priority 2 - Federal-State Relations Office
State Capitol
Charleston, West Virginia

This office must be involved because of the Federal grant given. Personnel of this office will probably coordinate the program.

Priority 3 - Department of Highways
State of West Virginia
Charleston, West Virginia

Priority 4 - Department of Motor Vehicles
State Office Building
Charleston, West Virginia

This department issued the laws pertaining to the disposal of abandoned and junk vehicles. Personnel from this office could be helpful in detitling the cars.

Authority: Chapter 17, Article 24
West Virginia Code

Priority 5 - State Police
State of West Virginia
Charleston, West Virginia

These officers will be responsible for finding the cars, obtaining title waivers and then arranging for collection.

Authority: Chapter 17, Article 24
Sections 3, 4, 5 & 6
West Virginia Code

Priority 6 - Sheriff, Monongalia County, West Virginia

This law enforcement agency could assist in picking up cars and enforcing penalty on violators.

Authority: Chapter 17, Article 24
Sections 3, 4 & 5
West Virginia Code

Government Responsibility - Continued

Priority 7 - County Court
Monongalia County

This group could possibly furnish a truck and driver to assist in the collection of junk car bodies.

Cost Estimate (For Collection Only)

Hauling Cars (85 for Dents Run Area) - - - - - - - - - -	$ 1,700
Lease for Collection Area (One Year) - - - - - - - - - -	1,200
Wooden Fencing Around Area - (Less Salvage Value)- - -	1,800
Total	$ 4,700

Cost Estimate (For Compacting)

Additional Hauling (415 Cars) - - - - - - - - - - - - -	$ 8,300
Less Salvage Value (500 Cars) - - - - - - - - - - - -	-2,500
Total	$ 5,800

Total - Collection & Compacting - - - - - - $10,500

Source of Funds:

1. Federal-State Relations Office
   State Capitol
   Charleston, West Virginia

2. Appalachian Regional Commission
   Washington, D.C.

3. County Court
   Monongalia County
   West Virginia

1.4 Extinguishing Burning Coal Outcrop & Refuse Bank Fire

1.41 Burning Coal Outcrop

A fire believed to be a coal outcrop was discovered in the field survey. This outcrop is located in Strip Mine J of Section G of Dents Run watershed. Some air pollution is generated which causes discomfort and possible health endangerment to people living in the vicinity. The coal outcrop will continue to burn since the fuel source is plentiful. The best method for extinguishing the coal appears to be to strip off the burning coal and spread it out with a cover of bottom ash to extinguish it by smothering.

Recommended Program - Short-Range

Step 1 - A representative of the Department of Natural Resources, State of West Virginia should ask the coal mine owners if they will extinguish the fire as a "good neighbor policy" to enrich their public image.

Step 2 - If the owner extinguishes fires, furnish the newspapers an article commending the action. If owner does not carry out work, proceed to Step 3.

Step 3 - Arrange for necessary equipment and operator to strip out burning section of coal, scatter coal and cover with bottom ash.

Government Responsibility:

Priority 1 - Department of Natural Resources
State of West Virginia
Charleston, West Virginia

Authority: Chapter 20, Article 6C-5
West Virginia Code

It was difficult to determine accurately whether the fire is a coal refuse pile or a coal outcrop, but remedial action can be taken under the authority given to the Department of Natural Resources since they have coal under their jurisdiction.

Priority 2 - West Virginia Air Pollution Control Commission
Charleston, West Virginia

Authority: Chapters 16-20
Series I, Section 4
West Virginia Administrative Regulations

Cost Estimate:

Mobilization and Demobilization	$ 300
60 Hours Work - D-7 Dozer	1,500
Hauling of Bottom Ash	500
Total	$2,300

Source of Funds:

Department of Natural Resources
State of West Virginia
Charleston, West Virginia

1.42 Burning Coal Refuse Bank

A refuse bank, located at Strip Mine J, Section C in Dents Run watershed is burning. This fire has been previously reported. This creates a small amount of air pollution, and is dangerous for people, particularly children, who are in the area. Since this is on the site of the recommended sanitary landfill, the refuse would be spread out and covered with dirt, clay or bottom ash to seal and extinguish the fire.

Recommended Program - Short-Range

Step 1 - Ask the coal mine owners if they will extinguish the fire as a "good neighbor" policy to enrich their public image.

Step 2 - If the owner extinguishes fires, give newspapers an article commending the action. If owner does not carry out the work, proceed to Step 3.

Step 3 - Engage necessary people and equipment to spread out the gob pile and cover with bottom ash to seal and extinguish the fire.

Government Responsibility:

Priority 1 - Department of Natural Resources
State of West Virginia
Charleston, West Virginia

Authority: Chapter 20, Article 6C-5
West Virginia Code

This was assigned to the Department of Natural Resources, State of West Virginia because they have authority to act under existing regulations and have funds already earmarked to carry out the necessary action.

Government Responsibility - Continued

Priority 2 - West Virginia Air Pollution Control Commission
Charleston, West Virginia

Authority: Chapters 16-20
Series I, Section 4
West Virginia Administrative Regulations

This responsibility was assigned to the West Virginia Air Pollution Control Commission since the air pollution is minor and seems secondary to the safety hazard.

Cost Estimate:

Mobilization & Demobilization- - - - - - - - - - - -	$ 300
60 Hours Work - D-7 Dozer- - - - - - - - - - - - - -	1,500
Hauling Bottom Ash - - - - - - - - - - - - - - - - -	500
Total *	$2,300

* If this is done in conjunction with preparing the landfill site, cost will be included as a part of site preparation costs of the landfill shown in that part of the report.

Source of Funds:

Department of Natural Resources
State of West Virginia
Charleston, West Virginia

2. Aesthetic Detriments

There are some areas of need in Dents Run watershed which, if properly recognized, could contribute to the betterment of the aesthetic value of the watershed. These might not be considered as environmental detriments in the light of this survey, but their importance to the progress of the area cannot be overlooked.

The watershed, approximately 3 miles north and south by 5 miles east and west, can be thought of as two different environments. The eastern half, containing two towns with a combined population of over 6,000 people, has been scarred by years of strip mining activity. It also includes the active mine workings of a large coal company. Many exposed deep mine drifts and auger holes are open along the strip mines to receive water, which is then turned into acid mine drainage and flows back to the Monongahela River from Dents Run. A new interstate highway is under construction across this half of the watershed.

The western half of the area is primarily agricultural. It is sparsely settled and contains very little mining activity to mar its natural beauty.

Three needs will be presented and discussed in detail. It is believed that action on each of these will enhance the correction of environmental detriments and help make this watershed an example to be followed in other places.

The three needs are:

a. Repair and Rehabilitation of Dents Run Boulevard
b. Establishment of Covered Bridge as Tourist Attraction
c. Enlargement of Westover Park

2.1 Repair and Rehabilitation of Dents Run Boulevard

Dents Run Boulevard is Route 49, which extends from Route 100 in Granville for 1.4 miles to an intersection with U.S. Highway 19. The road has been rerouted due to construction of I-79, so the road from the U.S. 19 intersection for 0.7 mile has been rebuilt. From this point for 0.5 mile, the road is low and has been flooded by Dents Run during the rainy season. The culvert across the road which carries acid mine drainage from the mine dump at the operating coal company tipple is too small and partially plugged. The State Road Commission is planning to install a larger culvert at this point.

Traffic has increased on this road tremendously due to failure of the bridge over Dents Run on Route 100. After the bridge is repaired, the load will be limited, so heavy truck traffic will continue on Dents Run Boulevard. Therefore, it is proposed that Dents Run Boulevard be raised in grade from the end of new construction for a distance of 0.5 mile toward Granville to prevent flooding and give a better road surface for the added traffic.

Recommended Program - Long-Range

Step 1 - Prepare plans for raising the grade of Dents Run Boulevard approximately 3 feet from the end of new construction near I-79 for a distance of 0.5 mile toward Granville. Proposal for road base is blend of bottom ash and fly ash, placed in 6-inch lifts and compacted. Surface is proposed to be a 6-inch lift of Ashphalt (a combination of bottom ash and emulsified asphalt) topped with a "chip and seal" mix of tar and limestone chips.

Step 2 - Arrange for funding as soon as possible.

Step 3 - Proceed with construction.

Government Responsibility:

West Virginia Department of Highways
Charleston, West Virginia

Cost Estimate:

Hauling and Placement of Material for Base 10,500 tons @ $2.20 per ton - - - - - - - - - - - -	$23,100
Spreading and Compacting- - - - - - - - - - - - - -	1,400
Surfacing New Road (0.5 mile) - - - - - - - - - - -	15,400
Total	$39,900

Source of Funds:

1. West Virginia Department of Highways
   Charleston, West Virginia

2. Appalachian Regional Commission
   Washington, D.C.

2.2 Covered Bridge Tourist Attraction

A covered bridge is in the watershed. It crosses Dents Run on Route 43/4 about 0.8 mile northwest of the U.S. 19 and Route 43 intersection near Laurel Point Church. The date of the construction of the bridge is unknown, but construction probably took place around the turn of the century. Figure 11 shows a view of the bridge.

FIGURE 11 - COVERED BRIDGE OVER DENTS RUN

The bridge is in need of repair, primarily on the west end. The beam across the top on the west end is broken in half and has been wired together. The broken beam, about 6" x 8", should be replaced. Part of the siding is missing and should also be replaced. The bridge should be repainted. The abutments are stone and appear to be sound, as do the lower beams.

It is proposed that 10 acres adjacent to the bridge on the north and west of Dents Run be purchased. This is a flat area which could be made into a picnic and playground area with parking facilities for cars. Since this is the only covered bridge in Monongalia County, and one of 18 in the State, it could be billed as a historic attraction for tourists. The picnic area could contain tables, children's playground equipment and restroom facilities. An all-weather plaque could give information regarding the bridge and its original construction.

According to information from the West Virginia Antiquities Commission, Morgantown, there is a procedure whereby one can apply for a particular place to be included in the National Register of Historical Places. If the covered bridge could be so registered, the National Park Service would then be receptive to a grant request for 50% funding for establishing the park area at the bridge site.

Recommended Program - Long-Range

Step 1 - Repair the bridge as needed and repaint.

Step 2 - Apply for inclusion of the bridge in the National Register of Historical Places.

Step 3 - Prepare plans for park at bridge area.

Step 4 - Apply for grant for park.

Step 5 - Arrange for work to be done in preparing parking area, picnic facilities, restrooms and playground area.

Step 6 - Open park to public with appropriate advertising.

Government Responsibility:

Priority 1 - National Park Service
U.S. Department of the Interior
Washington, D.C.

Priority 2 - Department of Natural Resources
State of West Virginia
Charleston, West Virginia

Priority 3 - Department of Highways
State of West Virginia
Charleston, West Virginia

Cost Estimate:

Cost of Land - 10 Acres @ $500.00 per Acre	$ 5,000
Parking Area - 2 Acres Covered w/Limestone	2,100
Restroom Facilities (Pit or Chemical Type)	3,000
Tables and Play Equipment	1,000
Bridge Repair	1,000
Total	$12,300

Source of Funds:

1. Public Land Corporation of West Virginia
   Charleston, West Virginia

   Authority: Chapter 20,
   Article 1, Section 20
   West Virginia Code

2. National Park Service
   Department of the Interior
   Washington, D.C.

2.3 Expansion of Westover City Park

Westover City Park is located at the south edge of the city, between U.S. Highway 19 and Route 19/19. It is a beautiful park area of 54 acres. Included in the park are wooded hillsides with picnic tables throughout. Flat areas include the home of the Monongalia County Fair, baseball or softball diamond, lighted Little League baseball field, lighted basketball courts, concession stand, other games and a privately owned stable facility.

It is suggested that consideration be given to expansion of the park to the south, where land is apparently available. This could be a regional park and adjoin the City Park, or be an extension of the City Park. No cost estimate is available for this suggested expansion, but the primary costs would be for the land and for constructing roads through the area.

Recommended Program - Long-Range

Step 1 - The County Court should determine the feasibility of expanding the Westover City Park, with the extension being a County Park.

Step 2 - If feasible, plans and cost estimates should be obtained.

Step 3 - Financing should be arranged to procure the land, provide the necessary roads and add any desired improvements or equipment.

Step 4 - Open new park to the public with appropriate advertising.

Government Responsibility:

Priority 1 - Monongalia County Court
Morgantown, West Virginia

Priority 2 - Monongalia County Consolidated
Recreation Commission
Morgantown, West Virginia

Cost Estimate:

Unknown

Source of Funds:

Unknown

3. Priority of Programs

The priority scheme for the programs set forth in this report is based on the following points in the order given:

1. Economic Benefits Realized
2. Health Hazards Eliminated
3. Improvement of Water Quality or Land Reclamation
4. Services to People
5. Compliance with State or Federal Laws

Based on information from other reports cited in the bibliography, it is noted that during the decade from 1960 to 1970 West Virginia was one of three states in the nation that lost population. It also had the greater numerical decline and rate of decline. West Virginia is the only state that lost population during two successive decades.

The general decline in population of the state is due primarily to increased mechanization of the coal industry and the subsequent reduction in employment, which has not been compensated for by increases in other sectors of the state's economy. Although the general state population trend is declining, some areas in the state are experiencing a growth in population. This represents a shift from rural to metropolitan areas which is evident in the towns and cities within Monongalia County, most of which are small in size. The area around Morgantown, which includes Dents Run, has increased in population, and the county has increased over 13% during the period that the state was losing population. Other statistics reveal that more than half of the state's employed workers are in "blue collar" occupations, and that one-third of the families in the state have incomes under $3,000 per year. The major sector of the state's economy is in nonagricultural work. The mining industry,

although it does not represent a large number of jobs, demands recognition as the major force in the control of the economy.

It appears that there are two areas in which the economy can be raised in application to this particular area of West Virginia. One area would be in the attraction of small industrial manufacturing or warehousing concerns to Monongalia County. The second area would be in the increase in the number of tourists coming into the county.

Both of these areas are related directly to water use and land use. The maintenance of the state's water within established water quality standards for the State of West Virginia will make them more acceptable for the water use categories applicable to such waters. The water quality standards established for the Monongahela River apply equally as well to its Dents Run tributary. The availability of good quality water will also encourage industrial investment and relocation in the area, which in turn will provide more job opportunities as industry learns it can expect and be virtually guaranteed a good source of water to meet the demands of its operations.

West Virginia has been trying in recent years to promote the state as an ideal place for hunting, fishing and vacation activities. One of the opportunities for an economic benefit for the state is in the area of recreation. If the waters are cleaned up so that fish life can be supported and opportunities for boating, swimming, etc., are made more attractive, this will help bring in tourists and sportsmen. This additional influx of people will be a boost to the economy in this area of the state.

An approved sanitary landfill operation and collection system will eliminate open and indiscriminate dumping and provide for land reclamation. The inauguration of a system for collecting trash in rural areas will provide the incentive to eliminate open dumping. The land actually reclaimed in the landfill area can possibly be used for housing developments, park areas, or future industrial sites. Cessation of open dumping and proper disposal of junk cars will eliminate breeding places for flies and rodents.

The provision for treatment and proper disposal of sewage and the operation of approved sanitary landfills for disposal of solid waste will comply with state and federal laws, which have established deadlines when each state must be in compliance. The provision for the installation of a historical site park and expansion of an existing park will provide services to people who live in the area, as well as tend to attract increased numbers of tourists.

Both environmental and aesthetic detriments have been considered together, but separate priority ratings were assigned to short-range and long-range programs.

3.1 Short-Range Programs

Priority 1 - Sewage Disposal for Individual Rural Homes

This program can start immediately. It will require no public funds or appropriations and is authorized by existing laws. An agency of the government is prepared to loan money to property owners at low interest. It will result in improvement of water quality in Dents Run, elimination of health hazards, better services to people and compliance with state laws.

Priority 2 - Burning Coal Refuse Bank and Coal Outcrop

This program can be accomplished with a minimum cost under existing laws. It is possible that the coal owners or operators will perform the work as a public service. This will eliminate health hazards, as it is a dangerous situation for any people who might come into the area.

3.2 Long-Range Programs

Priority 1 - Sewage Disposal for Dents Run Area

This project is the top priority for the Dents Run watershed. The cities are discharging raw sewage into Dents Run and/or the Monongahela River. Plans should be made to set up the public service or sanitary district, expedite the plans, arrange for financing and available grants and seek to have the plant and necessary collection systems built as soon as possible. The elimination of this pollution from the Monongahela River will improve the water quality and produce indirect economic benefits for the county and other cities downstream. It will comply with the State and Federal laws on improvement of water quality and provide a cleaner stream which can better be used for recreational purposes.

Priority 2 - Collection and Disposal of Solid Waste

This problem has been solved temporarily for the cities of the area where collection is provided. However, the rural areas have no place where residents can dump their trash legitimately, so many continue to dump it along roads and on strip mine benches. Sanitary landfills need to be established and collection made available in all rural areas to prevent indiscriminate dumping. This can best be done by a county-wide public service district as recommended. The trash marked on the map of the area needs to be cleaned up by the rural collection crews to prevent infestation of flies or rodents. Providing proper disposal for all trash and garbage would remove a definite health hazard in the area and help in reclaiming land for other uses. This would also be an improved service to the people in rural areas.

Priority 3 - Disposal of Junk Cars

This priority rating is assigned because of the health hazard involved. Removing the abandoned or junk cars from the area would fit very well into a county-wide program for junk cars and comply with state laws regarding junk cars.

Priority 3 - Disposal of Junk Cars - Continued

A collection point (or points) should be established in the county to allow for future junk car collection and stop the scattering throughout the entire county.

This program would benefit the area both from an environmental standpoint and an aesthetic standpoint.

Priority 4 - Establish Covered Bridge as Tourist Attraction

The Dents Run area needs some attraction to bring additional people into the area. This bridge, properly repaired and with an adjoining park, would be a real asset to the area. It would help to instill pride in the residents to have this park in their locality and would provide services to the people who live in the area.

Priority 5 - Repair and Rehabilitation of Dents Run Boulevard

Since failure of the bridge on Route 100, all traffic out of Granville has been routed on Dents Run Boulevard, or Route 49. Even after the bridge is repaired, heavy trucks will continue to use the road. In addition, the low areas of the road, already flooded once, will be subject to flooding again, especially during the rainy season.

The proposed use of bottom ash and fly ash as a base for the elevated roadbed would provide a use for a by-product material of the power industry. If successful, this usage could help to reduce the amount of this material in the Appalachian area.

This project would be a service to the people of the Dents Run area.

Priority 6 - Enlargement of Westover Park

The low priority for this endeavor is given because some facilities already exist which can be used. However, expanding the area and facilities would provide increased services for more people and fit in nicely with the rest of the proposed plans. Including something not now in the park, such as a swimming pool, would greatly enhance the park's usefulness.

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